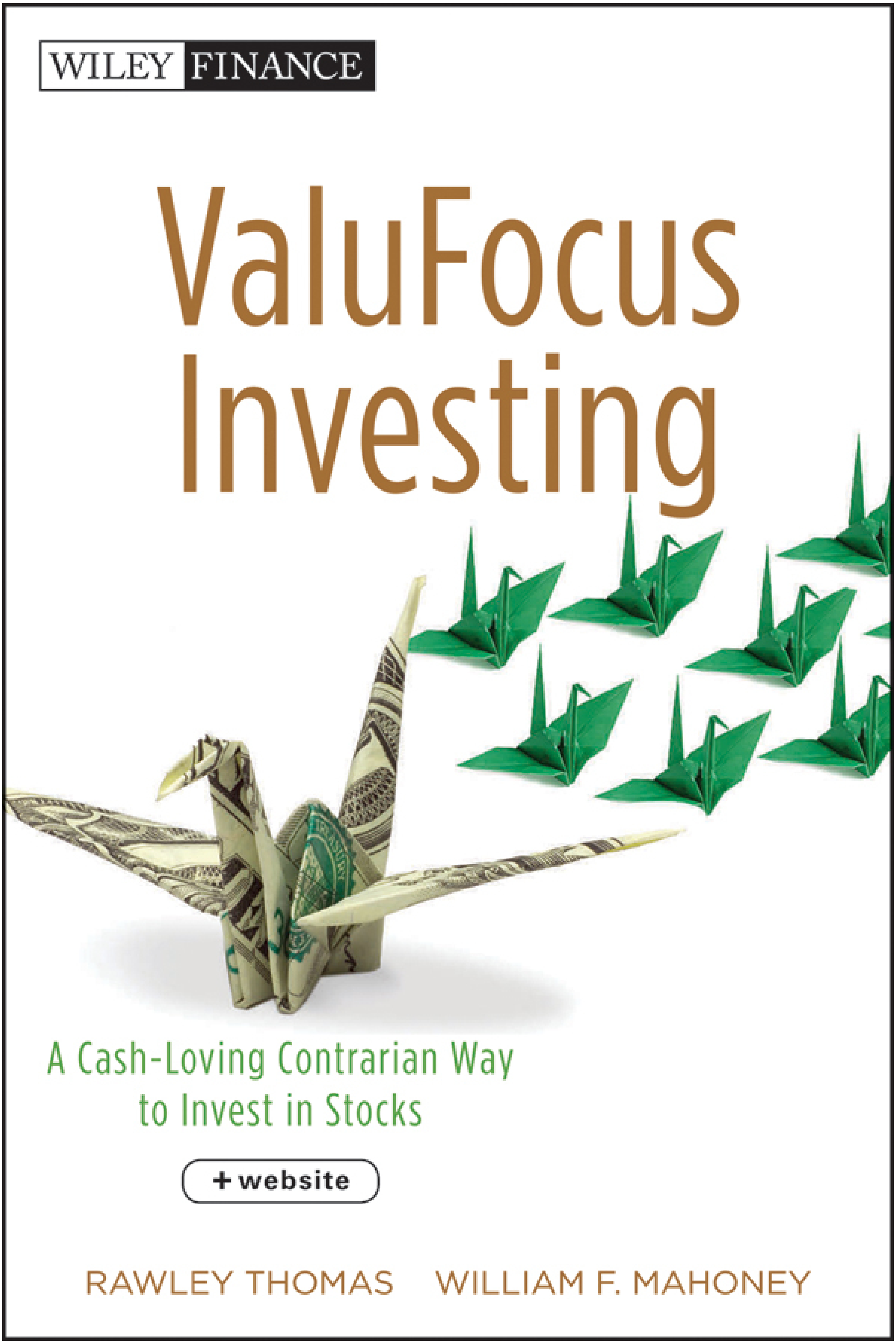
ValuFocus Investing: A Cash-Loving Contrarian Way to Invest in

Rawley Thomas



ValuFocus

Investing

Founded in 1807, John Wiley & Sons is the oldest independent

publishing company in the United States. With offices in North America, Europe, Australia and Asia, Wiley is globally committed to developing and marketing print and electronic products and services for our customers' professional and personal knowledge and understanding.

The Wiley Finance series contains books written specifically for finance and investment professionals as well as sophisticated individual investors and their financial advisors. Book topics range from portfolio management to e-commerce, risk management, financial engineering, valuation and financial instrument analysis, as well as much more.

For a list of available titles, please visit our Web site at www.Wiley

Finance.com.

ValuFocus

Investing

A Cash-Loving Contrarian

Way to Invest in Stocks

RAWLEY THOMAS

WITH

WILLIAM F. MAHONEY

John Wiley & Sons, Inc.

Cover Design: Leiva-Sposato.

Cover Art: Dollar bird, c

Tom Nance/ IStockphoto. Origami green bird, c

ks777 /

iStockphoto.

Published by John Wiley & Sons, Inc., Hoboken, New Jersey.

Published simultaneously in Canada.

For general information on our other products and services or for technical support, please contact our Customer Care Department within the United States at (800) 762-2974, outside the United States at (317) 572-3993 or fax (317) 572-4002.

Wiley publishes in a variety of print and electronic formats and by print-on-demand. Some material included with standard print versions of this book may not be included in e-books or in print-on-demand. If this book refers to media such as a CD or DVD that is not included in the version you purchased, you may download this material at http://booksupport.wiley.com.

For more information about Wiley products, visit www.wiley.com.

Library of Congress Cataloging-in-Publication Data:

Thomas, Rawley, 1946—

Valufocus investing : a cash-loving contrarian way to invest in stocks / Rawley Thomas with William F. Mahoney.

p. cm. – (Wiley finance series)

Includes index.

Includes index.

ISBN 978-1-118-25007-5 (cloth); ISBN 978-1-118-28324-0 (ebk); ISBN 978-1-118-28439-1 (ebk); ISBN 978-1-118-28623-4 (ebk) 1. Stock–Prices. 2. Value investing. 3. Corporation–Valuation. 4. Investment analysis.

I. Mahoney, William F. II. Title.

HG4661.T49 2012

332.6322–dc23

2012011620

Printed in the United States of America.

10 9 8 7 6 5 4 3 2 1

To: Benoit Mandelbrot, Bart Madden, The LCRT Brain Trust, The PDDARI Gang

and my Family

—Rawley Thomas

To: Indi, Carroll, Deb and my Family

—William F. Mahoney

Contents

CHAPTER 2

CHAPTER 3

CHAPTER 5

The Value Creation Process

CHAPTER 7

Relevant Market History of Investing

CHAPTER 8

Interpreting Market History

CHAPTER 9

CHAPTER 10

CHAPTER 12

Our Approach

CHAPTER 13

Focusing on Price Formation

CHAPTER 14

CHAPTER 15

CHAPTER 16

CHAPTER 19

Managing Your Stock Portfolio

CHAPTER 20

Advanced Portfolio Concepts

CHAPTER 21

What If You Don't Want to Employ ValuFocus

221

CHAPTER 24

Security Analysis and Modeling

CHAPTER 25

Wealth Management

CHAPTER 27

CHAPTER 28

Incorporating Risk into Our Model

CHAPTER 29

CHAPTER 30

Preface

We have written this book to serve several primary audiences. First and foremost are the many individual investors, who face a daunting task today in picking stocks and managing their portfolios in the face of the daily volatility confronting the equity market. We want to encourage them by offering a model that should deliver satisfying returns, especially for individuals who are patient and believe in longer-term investing horizons.

We believe that most individuals are investing for a longer-term purpose: Buy a home, provide higher education for their children, build a better lifestyle, and secure a comfortable retirement. Even students will find this book useful as they undertake the responsibility to invest for their future and their retirement. This responsibility shift will occur as drastic changes in the social security system and less debt / more savings for everyone becomes necessary.

ValuFocus Investing even offers a different framework for frequent traders. Traders who often follow price momentum strategies would benefit from using fundamentally based information to identify likely price reversals. Our model provides this ability.

This book also aims to benefit those professionals who recommend stocks and help manage investment portfolios for individuals and institutions alike. These professionals include investment advisors, financial planners, security analysts, brokers, investment managers,

and portfolio managers at brokerage and institutional firms. Under closer study, we believe that you will find the modeling process presented here to be worthy of serious investigation, becoming a key part or even the center of your fundamental way of investing. In fact, our empirical research demonstrates that reducing bias between price and intrinsic valuation in your discounted cash flow model increases your model's accuracy. Increased accuracy enables models to lower risk and achieve higher returns. Intrinsic value is derived from a series of calculations based on the fundamental cash economics of the firm.

ValuFocus Investing seeks to satisfy every reader looking into our investing methodology. The book combines a broad-based presentation of our model with a highly studious, detailed, and sometimes complex explanation of our process. You can choose one or the other or a combination of the two. Overall, the book is written to reach the widest audience, offering sections that describe ideas and refinements in their fullest technical detail.

PREFACE

Some of the descriptions are quite complex. The footnotes add important detail for the inquisitive investor, professional, or academic, plus there are numerous references to other books and articles, should you wish to dig more deeply into what we are presenting here. Skip the footnotes if you wish to concentrate on the book's application of a new investment process.

"Takeaways" at the beginning of each section and the end of each chapter offer an additional way to streamline your reading. In sum, we have tried to join together an investing and finance book that completely deals with intrinsic value and value investing.

We have written this book for knowledgeable people in both investments and corporate finance, and those eager to learn.

In our model, the key for investors is to understand a company's intrinsic value. This understanding should base itself on extensive empirical validation of the theory. We describe fully how to calculate a company's intrinsic value as the basis for knowing if the market currently is under-, fairly (close to), or overpricing its stock. Investors want to buy undervalued stocks and probably sell or short overvalued ones. We show investors how to estimate intrinsic value. More than that, we describe a tool that is able to calculate the intrinsic value of every company in our database automatically.

Thus, as an individual investor, you can become an "A" student of our modeling process, and you can apply it to pick stocks and manage your portfolio. Of course, we hope you will take full intellectual command of the model and the practical application databased tools being developed currently.

In addition, those interested in value management and corporate governance—the managers of business enterprises, who require capital from investors to run and grow their companies—will find many helpful concepts on value creation. It is our fond hope that business managers and investors will find a way to work as a team to once again bring about value creation and improve the health of our economy. This book suggests a path for that to happen. The path proposes a unique, consistent, and unified framework for both investing within the corporation and external investing in the corporation's stock.

We also have built some flexibility into the book for selective reading.

Most chapters are complete in carrying out the main ideas and thoughts being presented in them. As a result, you can read the book from chapter to chapter (and we encourage you to do that), or you can skip around.

We hope that you will forgive us for the certain amount of repetition that occurs as we work to have each section and chapter be separate, complete discussions of the subject matter. Additionally, we would like to think there is more understanding to be gained from reading this material more than once.

In writing this book, our hopes are high. We see a stock market that has been moving in the wrong direction for several decades now. It has a short-term focus. It has a trading focus, aided by the ability to employ technology to move in and out of stocks cheaply and rapidly. It has become highly volatile, offering fear more than confidence to many individual investors as well as professionals. It has a focus on accounting practice driven by earnings, instead of the cash-based economics of business. We suggest that the market has become less efficient, not more. Our goal is to move from a relatively small legion of "Cash Flow Contrarians" today to a market of

"Cash Flow Believers" tomorrow.

The book is divided into seven sections:

Section I:

The LCRT Investment Process

Section II:

A Brief History of Investing and Modeling

Section III:

Brief Discussions of Various Investing Methods Section IV:

Explaining LCRT's Conceptual Framework in Detail Section V:

How to Make Investment Decisions with ValuFocus Section VI:

Advanced Topics for Practicing Professionals

Section VII: Advanced Topics for Academics

Section I recommends that you purchase, sell, and short stocks by primarily focusing on the over-or undervaluation based on empirically validated theory that is consistent with how effective internal company management makes its investments.

Both the investors in the firm's stock and their manager agents should employ the same empirically validated conceptual framework for investing.

That framework relies on the managers investing in strategies that achieve returns on cash invested exceeding the investors' rate of return requirements.

Executive compensation should be based on the economic drivers of intrinsic valuation, include clawbacks, and reward top executives for deploying high return on capital new strategies. As the investor, you should have a "say on pay" for your corporate manager "agents."

Section II explains the roles of the "giants" who preceded us to provide the basis for the "paradigm" shift that *ValuFocus Investing* recommends.

Section III offers a brief discussion of the existence of intrinsic valuation, the importance of price level estimation, and various investing methods. We explain why we have decided not to use some methods or how best to incorporate others into the LCRT valuation framework.

Hopefully, these short descriptions will stimulate your thoughts so you will reexamine your methods and their implicit underlying assumptions for investing.

PREFACE

Section IV covers a series of chapters to explain LCRT's conceptual framework in more detail. Intelligent use of the database software should include reading this more technical section.

Section V specifically describes how you may use our implementation tool to achieve higher returns with lower risk.

Section VI covers advanced topics for the practicing professional. As a security analyst, model builder, wealth manager, or portfolio manager, how can you best apply the intrinsic valuation research offered in *ValuFocus Investing* in a practical way?

Section VII covers advanced topics for academics. Until the market

"wakes up" to a better way based on cash economic returns instead of earnings, you can achieve higher investment returns with lower fat-tailed risk with your information advantage.

By the end of this book, we plan to convince you that the LCRT

framework is:

1. Simple to use, but not simplistic (like driving a car).

2. Conceptually sound.

3. Empirically validated.

4. Achieve lower fat-tailed risk to produce higher returns.

5. Unique.

Acknowledgments

RAWLEY THOMAS

Iacknowledge the extraordinary debt that I owe to both Benoit Mandelbrot and Bart Madden, whose wisdom and graciousness formed the core foundation for this book.

I also thank the "LCRT Brain Trust" for their numerous contributions to the theories, research, and applied product development which underlie this work. In alphabetical order, they include Bob Atra, Amit

Dugar, Bill Hass, Lee Hayes, Terry Heiland, Bill Mahoney, Shep Pryor, Randy Schostag, Nancy Thomas (no relation), Mark Ubelhart, and Dandan Yang. Many are mentioned in the text or footnotes for their specific contributions.

I have been honored to facilitate the FMA PDDARI as Supported by the CFA Society of Chicago and the FMA PDDARI Advisory Committee.

FMA PDDARI is the Practitioner Demand Driven Academic Initiative of the Financial Management Association. Its purpose is to bridge practitioner needs with both academic and practitioner research. The depth and breadth of those monthly and quarterly discussions contributed greatly to my thinking about this work. Being in the "vortex of the information flow"

within the profession provided a unique vantage point across the silos of separate concentrated expertise. In alphabetical order, PDDARI includes Michael Falk, John Finnerty, Mike Lindh, Paul Kaplan, Jack Rader, Mike Riley, and David Walker.

I thank Bill Falloon, Senior Editor at Wiley and Marty Schecter, Director of E-Business Development at Wiley for quickly grasping the vision for this book—what it could do for the individual investor and the profession.

Four members of the "LCRT Brain Trust" deserve special mention. Bill Mahoney translated my dense communications into understandable prose for enjoyable reading. Bob Atra is a "teacher's teacher" and wrote three Chapters in Wiley's *Valuation Handbook* on LCRT research. Lee Hayes possesses the uncanny ability to connect markets and associated products.

Terry Heiland, co-founder of LCRT, my partner and close friend, created brilliant system designs to automate the research process by a factor of 200.

Those designs made LCRT research and this book possible.

I cannot forget my family without whose emotional support to make

all this better were crucial to the creation of this book—Kelly, John, Alexis, and Kim.

BILL MAHONEY

It is a privilege to work with Rawley Thomas. I am honored to have the opportunity. He is brilliant, dedicated, and has worked tirelessly to continue his efforts to develop and then refine what he truly believes is a better way to make investment decisions. In working closely with him over the past five years in preparing this book, I have become convinced that his investment modeling process is the better way.

ValuFocus

Investing

Section

One

The LCRT Investment

Process

Section I outlines the LCRT (LifeCycle Returns, Inc.) investment process.

Chapter 1: Introducing Our Investment Process

Chapter 6: The Corporate Perspective

Chapter 1: Introducing Our Investment Process 1. Investors should buy, sell, and short stocks based on the intrinsic value derived from the economic fundamentals of the underlying firm's business.

2. Investors should concentrate first and foremost on the long-term cash fundamentals of the business to produce intrinsic valuation levels, not short-term price momentum or multifactor approaches created from price change models.

Chapter 2: A Better Way to Invest in Stocks Base your investment decisions primarily on the under-or overvaluation of the whole market and the individual stocks within that market.

1

2

THE LCRT INVESTMENT PROCESS

Identify "inflection points" where prices are likely to reverse direction by possessing a better understanding of the ranges of bounded rationality around intrinsic valuation as the anchor.

Chapter 3: Advantages of Economic, Cash-Based Modeling A focus on the economics of a business and its cash flow leads to holding stocks longer. Longer-term investors help make the market more efficient.

The market increasingly has become more short-term driven because of the widespread use of models built on price momentum and change and not on price level. These "noise" traders create opportunity for true investors.

True investors narrow the ranges of price and risk, helping to build a more efficient market. Good information gives investors an advantage. Bottom line: The key is to understand price level, not price change.

Chapter 4: Analyzing Mental Models

Multiple mental models employed by investors refute the traditional academic assumption of "homogeneous expectations." Not everyone is utilizing the same model!

Empirical evidences can measure the "goodness" of the models. LCRT

provides extensive empirical evidence.

Stark inconsistency exists between the capital budgeting and strategic planning models/processes used within corporations and the models used by outside investors. These models should be consistent.

Chapter 5: The Value Creation Process

In the longer term, companies create shareholder value by investing in strategies that produce returns on capital above the cost of capital.

Returns on capital should be based on cash flows and the investor's cash investment in the firm's assets, not earnings and depreciated assets.

Costs of capital or investor return requirements should be based on the valuation model, not CAPM beta-adjusted models.

Both returns and costs of capital should be inflation adjusted or ''real,'' not based on historical cost.

Chapter 6: The Corporate Perspective

You, as the investor, and your corporate manager agents should employ identical, empirically validated principles to make your investments! *ValuFocus Investing* bases itself on identical principles that reflect the internal

rates of returns (IRR) of all the projects in place within a corporation to model likely future cash flows in a competitive economy.

A market focused on short-term earnings instead of cash flows contributes to significant inefficiencies in the capitalist system. We need a better way.

Until the market "wakes up" to a better way, you may increase your equity investment returns by buying from or selling to less knowledgeable investors or traders. Please consider understanding the *ValuFocus Investing* framework and employing our implementation tools to achieve higher returns with less risk.

Executive compensation would improve with a greater emphasis on the economic drivers of intrinsic valuation,[1] less emphasis on stock options, and elimination of earnings instead of cash flow as a primary element. It also should include clawback provisions for risks gone bad and reward top executives more for value creating new strategies than running the existing business.

To beat other equity investors, you need the information advantage of a better framework and better tools. This book describes that framework and offers those tools.

[1]Return on capital devoted to retaining and attracting customers, growth in profitable investments, and so on.

CHAPTER 1

Introducing Our

Investment Process

How should decisions be made on buying, selling, and holding stocks?

In a perfect market, those decisions are made on the basis of fundamentals.

In this case, we mean the specific characteristics investors feel are important when selecting a company for their equity portfolio.

Of course, the fundamental principle of the market is that prices at the moment are based on expectations of a company's performance in the future.

The price today reflects how investors collectively believe the company will perform days, weeks, months, or years from now.

Time horizons come into play. Long-term investors are using their views to forecast a company's results perhaps five years from now, or three, or two, or next year. Investors with short horizons who are seeking to capture quicker profits likely are projecting results in months. Thus, prices are based on expectations and predictions and the future. No one can predict the future accurately. Some investors who do it better than others make a lot of money, for a while. Hopefully, their talent never leaves them.

What do we mean by a company's fundamentals? In sum, they focus on the ability of management to generate certain levels of revenues and cash, and to run their operations effectively, resulting in profits and excess cash that are reinvested to achieve more revenues and cash, which drive the stock price higher.

An accurate analysis of a company's historical fundamentals is the stag-ing point of determining if the stock is fairly (close to the price), under-, or overvalued. An investor also has to develop a view of a company's performance to gauge future results. An investor who can more accurately assess these drivers will be more successful. Undervalued stocks are purchased for the investor's portfolio, while overpriced stocks are sold. Fairly priced stocks are kept when the investor is confident the company can continue to create new value. They are sold when the investor is convinced the fundamentals are about to lead the company's performance downward. This investment method has been called a "buy-low and sell-high approach." It is a longer term investment approach. But how does an investor know when a stock 5

is under-or overvalued? The model we discuss in this book is well suited to accomplishing an accurate analysis of the fundamentals of a company to determine its intrinsic value.

Of course, the market eventually has to recognize the intrinsic value of a company, buying shares to push up the price or selling shares to drive the price down closer to fair value.

It is our contention that prices are doing just that—moving toward fair value, based on good analysis of the fundamentals of each company. This process encounters many bumps in the road caused by human behavior as investors respond to a plethora of factors or pursue perceived opportunity or react in fear. Many times, these responses and actions and reactions are over the top.

Indeed, it may be harder for you to believe that prices of stocks move toward fair value today, given market behavior in the past few years.

The issue comes down to whether investors want to hold companies in their portfolios based on the best fundamental analysis of their values. Or do they prefer to "play the market," basing their decisions and actions on investor behavior and momentum?

Objective observers of behavior over recent years are inclined to conclude that the market is being driven primarily by sentiment and momentum rather than by good analyses of the fundamentals of company after company.

In support of this unfortunate trend, there has been an upswing of models aimed at capturing high returns by observing market behavior accurately.

These models often are built on computer-generated quantitative data analysis of recent investor behavior with the expectation that it will continue or change. Or they are built on determining the prime factors driving investor actions and statistically regressing these factors, such as earnings acceleration or earnings surprises or relative price strengths. The problem is that these models essentially analyze what recently has happened in the market, not what is coming next. Their unstated assumption is that trends always continue. But trends continue for a while until they don't, and when they don't, you can lose a lot of money.

All this has led to more trading of shares and dramatic increases in trading volume as investors try to catch gains or cut losses. This cumulative action is causing a market that is more short term in its

horizon. Add to it what appears to be a growing number of investors building models designed to capture gains more quickly. In fact, our sense is that a significant majority of research dollars is going into short-term tactical trading instead of long-term, cash-based, fundamental intrinsic valuation. We even suggest that this research emphasis is making the market less efficient, not more.

Certainly, greed is at work here; fear has been brought back recently with the severe market downturns. But investors and the media can make a

good case for blaming the market decline on big macro factors, such as the subprime mortgage debacle followed by a recession, leaving the justifications for using these short-term models—earnings models, momentum models, multifactor regression models—intact.

Where does this leave investors who want to analyze the fundamentals and make decisions based on the performance and prospects of each individual company?

It certainly would appear that more of the investment community has been moving away from fundamental analysis. We have to ask the question: Are they doing this because they believe the approach is no longer viable or because market realities leave them no other choice?1

Surely, some investors who were previously focused on the fundamentals have lost some confidence or courage and have switched horses in the face of what can appear to be a stampede. But we think the percentage remains small and investors with longer-term horizons and methodologies based on good analysis of the fundamentals of businesses still constitute the foundation of equity investing.

We hope that business fundamentals always will constitute the foundation of stock investing because it constitutes basic common sense and unquestionably proven best practice.

Stocks should be bought and sold based on the fundamentals of the business, analyzed and understood to the best ability of investors.

And our job now is to convince you that this proven methodology has gotten even better and we are closer than ever to accurately calculating the intrinsic value of every company with information available to the investing public. Also, because fundamental investing

may be less popular now, it 1On the one hand, academics are fond of assuming that all investors are "homogeneous." This means that all investors use the same tools, look at the same information, and employ identical models. Reviewing a sampling of investment advisor ads reveals how unrealistic this homogeneous assumption is. Each ad tries to portray its unique offering.

On the other hand, behavioral finance academics note how wide the ranges of prices are within any time period—day, week, month, or year. These ranges of bounded rationality simply are too wide to be caused by changes in the fundamentals (Robert Shiller "Do Stock Prices Move Too Much to be Justified by Subsequent Changes in Dividends," *American Economic Review*, January 1981, pp. 421-436; Vernon Smith, "Experimental Methods in the Political Economy of Exchange,"

Science, Vol. 235, October 10, 1986, pp. 167–173; and "Stock Market Experiment Suggests Inevitability Of Booms and Busts," *Wall Street Journal*, November 17, 1987). Consequently, we suggest that the market overreacts and underreacts when new information arrives. Only by calculating an intrinsic valuation as the "anchor"

can we estimate where the price resides within its gyrations of market sentiment.

will be more profitable for investors who continue to follow the process.

Contrarian investing always is more profitable.

We want you to become a member of the small band of courageous, economic, cash-driven investors—called "Cash-Loving Contrarians."

Together, we can grow into a powerful force driving the market based on solid fundamental analysis.

KEY TAKEAWAYS

1. Investors should buy, sell, and short stocks based on the intrinsic value derived from the economic fundamentals of the underlying firm's business.

2. Investors should concentrate first and foremost on the long-term cash fundamentals of the business to produce intrinsic valuation levels, not short-term price momentum or multifactor approaches created from price change models.

CHAPTER 2

A Better Way to Invest in Stocks

It's all about predicting the future. But we all know that's impossible.

Still, brilliant minds—thousands of them—have been working for over a century at perfecting the stock-investing process.

What could possibly be left to learn?

Optimizing returns is all about picking stocks that go up in price. Plus, many of these companies also pay a dividend. The sought-after result for stock investors is growing total shareholder return.

Understanding the need is simple. It is to figure out how a company will do in the future.

Doing that accurately is the challenge. The reality is that it can't be done perfectly. But it can be done better for most investors.

Investors know that present stock prices reflect the market's effort to predict a company's performance. That $30 per share price is what investors believe the stock is worth today. That $30 price is based on the company's revenues, profits, and available cash flow to remain viable while continuing to invest in profitable growth going forward.

Bottom line: Successful stock picking is measured by how well a person can predict the future—both how well the company will do and continue to do, and what the stock market believes will be the company's future performance.

Everyone tries to make good predictions and will continue to try.

We believe we have figured out a better way. We really have, and the purpose of this book is to lay it out for you.

PUT THE FOCUS IN THE RIGHT PLACE: ON A

COMPANY'S FUNDAMENTAL VALUE

Wouldn't it be wonderful if we had a truly accurate method and

model for valuing companies and their equity on the basis of their fundamental value?

We could stop pricing a stock on all the immediate, short-term actions that have very little if anything to do with the fundamental value of the company's business. Furthermore, suppose a momentary development or 9

macro event occurs that indeed does impact the value of the business. We could input that information right into the model to update the calculation of the company's intrinsic value.

Our ability to know a company's intrinsic value at any time would be our basis for determining whether to own, buy, sell, or hold shares. This ability would tell us whether the market is pricing the stock at or below or above the company's value.

If the value is above, we sell or don't buy. If the value is below, we buy.

Why? Because we know the market is at least sufficiently efficient to move toward and maybe even eventually catch up with the proper valuation. The price will come down or go up as the market realizes the proper value of the business. We have the advantage of knowing that value ahead of time.

Indeed, at all times, that knowledge forms the basis of all our stock selection decisions and our portfolio construction.

Really important in this scenario is timing, namely: when to buy and when to sell and when to hold. Our decision process reads the inflection points driving the company's fundamentals—whether macro or company-based. Those inflection points tell us when the company's economic performance is changing. When the earnings do rise or fall is when investors (and analysts) begin realizing the stock is under-or overpriced, causing the market to start to buy or sell.

WE BRING YOU AN IMPROVED METHODOLOGY

How would you like to have a stock-investing methodology that focuses on calculating accurately the intrinsic value of the company? Isn't that the best foundation for making decisions to buy, sell, and

hold stocks? You will gain a huge advantage by applying this model in managing your stock portfolio.

Indeed, imagine how beneficial it would be to anticipate price changes up or down before the actual price movement. Think how this would improve your portfolio performance.1

1And make prices more accurately and continuously reflect intrinsic valuations to improve the functioning of the whole capitalist system. Accurate market prices would provide corporate executives better signals on how best to allocate capital.

Corporate executives would no longer be confused about noise traders, short-term earnings, surprise-driven stock prices, and the long-term economic drivers to manage the operating capital under their control.

Consequently, corporate executives would labor more effectively for long-term returns on your stock investment.

Let’s say the intrinsic value calculation shows the stock to be worth $30 a share. But the market currently is pricing it at $20 or $40 a share.

Eventually, the market catches up with these under-and overpricings by making the appropriate adjustments. So you can buy with confidence when the price is under the inherent value of the business or sell your shares when the stock is overpriced.

At times market volatility is so strong that fundamentals are blown away. We certainly have seen that recently as the economy slid and portfolios lost more than half their value. In a volatile market, such as we have been experiencing of late, accurately valuing a company becomes the critical advantage.

You can overcome these scary bouts with volatility and uncertainty by working with an investment model that focuses on understanding each company’s intrinsic value as the basis for pricing its equity. It’s good to be a longer-term investor when using this model, but investors wanting to move in and out of stocks more quickly certainly can benefit from it as well.

When the market is mispricing a stock higher or lower for whatever reason, it just may take a little more time for the correction to occur. Longer-term investors can buy the shares well below fair value and

enjoy the rising returns as market stability and investor wisdom take hold. Investors can realize from the model that certain stocks are overpriced and sell them before the market catches up with the reality. Short-term investors can use the knowledge from the model to make better trading decisions based on clearer understanding of the relationship between the current price and the intrinsic value of the business.

What we are doing here is turning the ideal way of investing in stocks —namely, modeling each company's fundamentals—into the practical way of doing it. Isn't it about time that the individual investor had an investment edge?

Ideally, you want to make decisions on which stocks to buy, sell, and hold based on the fundamental performance and prospects of each company. That's the way investors and the equity market should behave. In fact, that's how they did behave in "the good old days."

But other factors are driving investment decisions above and beyond companies' fundamentals, which leads to over-and undervaluation. You, as an investor, can take advantage of this by focusing on those factors that truly impact value and ultimately stock price.

Sometimes, these factors so overwhelm the market that the wisest, most experienced, and most qualified investors can't predict with any confidence or sense of accuracy what will happen next—next year, next month, next week, or even in the next half-hour. All the pros have models and they have convictions (most are glad to talk about them on CNBC, Bloomberg,

and elsewhere). Some turn out to be right, but many have turned out to be wrong. Being wrong occurs especially during the optimistic times when the market continues to fall, such as it did in most of 2008 and well into 2009.

These overriding drivers of stock price come in many forms and fears.

Certainly in recent times, the state of the economy has been the prime catalyst in investor decisions. Indeed, confidence in the fall of 2008 was at an all-time low, based on very real concerns: tens of thousands of housing fore-closures, high costs of such commodities as oil and foodstuffs, dramatic cutbacks in consumer spending, bankrupt

financial institutions, severe lack of capital available to invest, mounting job losses, and growing unemployment in virtually all fields of endeavor. Add your own concerns as you feel them.

Clearly, in times like these, macro factors are more important on a daily basis in seeing how the stock market will do at that time than company fundamentals. But even then, as a longer-term investor, you can wait patiently for better economic conditions.

It also is beneficial to recognize that many of these fears resolve themselves. Some impact financial performance and others don't. When the dust settles, people continue to work, eat, buy houses, and brush their teeth.

Companies also adjust to the new "normal" by dropping unprofitable products, investing R&D in emerging technologies, and trying to establish new economic growth. Historically, some companies are very good at managing these transitions. These are the companies to own when these macro inflection points occur.

Clearly, in the face of all this turmoil, investors need a new model on which to base their stock buy/sell/hold decisions—a model able to identify companies that can thrive in this most challenging environment.

BASING DECISIONS ON UNDER-AND OVERVALUATION

BY THE MARKET

In times like these, and in all times as a stock investor for that matter, we turn to *certain* fundamentals. And nothing is more fundamental than the goal of buying stocks that are priced less than the inherent value of the business. And nothing is more fundamental than selling stocks priced higher than their intrinsic value. Keeping that logic going, we may maintain in our portfolios stocks that are fairly priced when we are confident that the managements of those companies will continue to create more value during economic transitions.

There is another important fundamental that completes this universal reality. It forms a key part of the basis of our investment methodology. Our extensive and intensive research shows that about 20 percent of the stocks

comprising the market are significantly underpriced (undervalued) at

any time, while about 20 percent are significantly over priced (overvalued). During these times, you must pay significant attention to these companies. The overpriced stocks tend to take a real beating. The undervalued companies with low financial leverage tend to rise in price relative to the rest of the market. However, the severely undervalued companies in financial distress may go bankrupt or they may have valuable assets that need to be reorganized for value creation. The survivors provide significant returns when the transition is complete. The investors in bankrupt firms lose most of their investment. Understanding which is which is key to superior investment success.

Eventually, investors comprising the market recognize the over-or underpricing of a given stock and begin to take appropriate action. Either they begin buying shares of an underpriced company that is financially sound, thus driving the price higher, or they begin selling shares of an underpriced company that is too highly leveraged with debt to make the transition, thus driving the price lower or even to zero. The overvalued financially sound company tends to survive, but at a significantly lower price.

Typically, something or a series of things trigger investors to make that realization to buy or sell. These events likely are macro in nature, more specific to the company, or a combination of the two. We offer some real situations that apply.

■ Favorably, a regulatory decision affecting the sector or company, a hot new product, massive cost savings, a new management team, successful expansion of an existing product line into new markets; there are many more.

■ Unfavorably, laws hurting an industry or company, a declining economy, effective new competition, falling market share, rapidly rising operating costs, obsolete markets or management; there are many more.

THE KEY: RECOGNIZING THE INFLECTION POINTS

We have a name for this critical time and event: We call it an inflection point.2

2Most often new material information causes changes in intrinsic valuations and associated price changes. Infrequently, large changes in intrinsic valuation cause tiny changes in price, because the "new" information is not really new. It has been leaked and already

anticipated by the market. The best examples of this effect are EPS surprises that elicit no price reaction.

Thus, what is vital for an investor is to be able to recognize, identify, and quantify inflection points as they occur, or a series of inflection points as they are occurring. Often, for a company, there is more than one inflection point. And they can be unfolding over a period of time, usually within months of one another, adding impact to a company's value, positively or negatively.

There also are inflection points for markets in general, as in 2001

and 2008. These time periods tend to revalue the whole stock market.

Undervalued financially sound companies tend to fare better during these periods. These companies do not have high debt, and they have a history of managing these transitions well. They also are in market segments that are impacted less during these economic contractions or actually benefit as people transition to their products. Low-cost producers tend to gain market share during these transition times and acquire weaker players.

Of course, on the one hand, these inflection points can be positive, sure to elevate the stock price as more investors recognize them. On the other hand, they can be negative, sure to drive down the price as investors recognize slower or negative growth.

A vital investing principle is at work here. What matters are price *levels*, not price changes. Obviously, price changes are relevant to investors. What is important to understand is that price levels serve as the basis to quantify price changes.

Unfortunately, most investors act mainly on price change. Momentum is driving their decisions—how the market is moving or the price movement of the particular stock.

We say what matters is the price level in relation to value and the company's ability to manage transitions—both macro ones at the economy level and micro ones at the firm level. This is far more fundamental. It should be tied to a company's future performance. It requires a deep, accurate analysis of the company's operating and financial characteristics—its strengths, weaknesses, and prospects.

Historical performance is important to gain insights into future performance and the ability of executives to manage transitions.

LOOKING AT OUR MODEL

Now we have come to the payoff. Investors need a model that accurately calculates the intrinsic value of a company as the basis to determine if the market currently is over-, under-, or fairly pricing the stock.

When the whole market is fairly priced, we know that about half the stocks in the universe are underpriced and half are overpriced. We will

offer empirical proof of this premise later in this book. In addition, we are confident that smart investors eventually will move each stock price closer to fair value by buying shares or selling them accordingly.

We need a model that helps us identify the inflection points for both companies and markets. These are the actions and events that will change the value of the company and/or change the stock price. The macro or micro inflection point identified by the model can impact the company's operations and fortunes. It also can be an event that prompts investors to buy or sell shares.

Our goal is to fill our portfolio with underpriced stocks. These are good companies during normal markets. We make money when the price rises as market awareness causes more investors to buy the same stocks. As the price of a company reaches fair value, we will decide to hold or sell our position. Working with our investment model, our analysis of the company may determine that it is capable of continuing to generate more value or already is in the process of doing so. In this circumstance, we decide to keep the shares or even add to our position. Alternatively, the recent rise may indicate the price has reached or is exceeding fair value, so it would be wise to sell our shares.

By using the model properly, we also can understand when some macro inflection points are impacting the total value of the market. Dangerous inflection points occur when market prices are high and future earnings forecasts are opportunistic. In this case, highly overvalued stocks are dangerous, while undervalued companies with high debt or serving deteriorating markets may continue to underperform in a good market but be destroyed by a negative

inflection point. During this time, investors must do extensive research on these risks and opportunities, being prepared to increase their cash position.

One word of caution: The stock market can be overvalued for a long time. However, you don't want to really be out of the market. In these situations you want to become more defensive. The undervalued companies need to be sound—with low debt and good management that can take advantage of transitions. These companies already should be repositioning their assets, investing in winners, and selling losers. Those investments need to be studied in detail. A company that is overpaying for these new assets is creating a problem. A company focusing on just growing revenue and earnings and not improving economic return on capital also is building a problem.

You can continue to hold an overvalued stock, but it is wise to reduce your exposure. If momentum drops off, sell. Extremely overvalued stocks (stocks outside the high rational price bound of Rawley ranges described around Figure 16.5) need to be sold, even if positive market momentum is

strong. You can reinvest in these companies after the market corrects. When the inflection point hits, these stocks can get killed in minutes, preventing you from getting out. You will hear everyone on TV say it's a buying opportunity of a lifetime, but it isn't. These stocks may never reach that high again. Markets take months to bottom.

Years of intense research, continuing model refinement, portfolio management experience, and backtesting across a wide spectrum of stocks give us the confidence that the model described in this book effectively calculates the intrinsic value of companies. It provides a roadmap for identifying and quantifying inflection points as the basis to manage a portfolio of equities.

We must add an important footnote. We are addressing true investors here. This is a longer-term proposition. It requires patience and studious work. Investors needing quick returns, "capture-the-momentum-now investors" need not apply. On second thought, please read the rest of the book. Maybe we can persuade you that we offer a better way to invest in stocks.

Here is where we get into the long-standing battle among academics

and investors over which is the better measure—earnings or cash.

We believe that cash clearly is the winner.

Yes, each has its flaws, but we can show that cash more accurately determines both the basic strength of a business and its ability to grow.

Cash is a more pure measure. It is real money, and it is used to pay the bills.

It is less likely to be manipulated or, put another way, manipulated less.

Cash is a leading indicator and very few investors use it!

In contrast, earnings are less pure inherently. Scholars and investors have refined accounting practices involving earnings to an extent that makes them downright unreliable as a measure of business performance. We will delve deeper into that reality as we go along.

KEY TAKEAWAYS

1. Base your investment decisions primarily on the under-or overvaluation of the whole market and the individual stocks within that market.

2. Identify inflection points where prices are likely to reverse direction by possessing a better understanding of the ranges of bounded rationality.

CHAPTER 3

Advantages of Economic,

Cash-Based Modeling

We believe that our modeling process, focusing on cash flow as the best measure of a company's economic performance, serves to encourage investors to hold stocks longer. Holding stocks longer improves their opportunity to achieve higher returns by reducing turnover costs of brokerage commissions and price impacts. Good decisions, built from understanding a company's intrinsic value from its cash flow fundamentals, generate optimal longer-term gains.

Investors with longer-term outlooks contribute to a more efficient market. Our ongoing study and analysis of our value charts (please see

Chapter 27, beginning with "Starting with a Baseline Model") shows whether a market is behaving more or less efficiently. When the market is getting systemically more efficient, the dispersion of market prices around the intrinsic values of companies contracts.[1] Also, the rational range of high and low market prices contracts. We call these Rawley ranges of bounded rationality (described around Figure 16.5). These empirical insights can be shown statistically.

Instead, what seems to be occurring is a predominant use of modeling techniques that are more short-term driven. Quantitative and multifactor models today are mostly of a short-term nature. They are generating trading and what the market calls "noise trading," instead of a sane market operating at a high level of control with investors making decisions on good analysis of fundamentals and intrinsic values. The short-term traders are adding to the noise and dispersion of market prices. Indeed, we can see that reality in the rapid market swings and wide dispersion of market prices, occurring virtually daily.

1Robert J. Shiller, "Do Stock Prices Move Too Much to Be Justified by Subsequent Changes in Dividends," *American Economic Review*, January 1981, pp. 421–436; Vernon Smith, "Experimental Methods in the Political Economy of Exchange," *Science*, Vol. 235, October 10, 1986, pp. 167–173; and *Wall Street Journal*, November 17, 1987.

So much for the traditional view of the academic community that the market is getting more efficient and any good new approach to investing will be quickly competed away. The latter is quite unlikely. Why? Most of the quantitative research and the vast majority of money being spent on it by the investment banks and institutional investment firms are going into these short-term, day-trading strategies. Listen to the noise. These traders (I can't bring myself to call them investors) only increase the likelihood of market overreaction and underreaction. They certainly don't decrease it.

We know that to be true: They are not basing their actions on equilibrium intrinsic valuation. In fact, they consider only price movements to drive their decisions, not a cash flow analysis of the company's fundamentals.

If that is the way the market players want to operate, you can make

the money they are losing. It is that simple.

These "investors" (noisy traders) are creating an opportunity for you that can last a long time—a lifetime. We are creating the opportunity for you that isn't available and probably isn't even on the minds of this horde of heterogeneous investors who believe in short-term trading, day trading, second trading, whatever. They are momentum traders. They are following the momentum and never seem to focus on intrinsic value as the anchor that determines when the momentum reverses itself at an inflection point.

These momentum, quant, and day trading advocates just don't look at the market the way we do. Their investment strategy is similar to music chairs; you dance until the music stops and then you scramble for a chair (or in this case a profitable exit). The problem is, as an individual investor you don't get to "play the music."

This is why we call ourselves Cash-Loving Contrarians. We need to bring sanity back to the market. Only this time, we want investors to focus first on the fundamental economics of a business—on its ability to generate cash, pay the bills, and invest the remaining cash to grow.

We can restore sanity to the market and build the investment process with a focus on true economics. We are realistic, which means taking a longer-term view of our desire to change the investing world and our belief in its benefits. This change won't happen overnight.

The work we have been doing over the past three decades can be taken much further. Bright minds among the academics and investing community can extend the valuation models. We plan to continue improving our modeling process. Together, we add the excellent output of analysts, improve the databases, and gain the advantage of new information/data currently not available. The models steadily do a better job of in-depth analysis, constantly updating the economic drivers, identifying the outliers, and more.

Financial reporting and data provide the basis to make the cash economic return calculation—a most important driver of firm performance

and stock returns. (This calculation is explained briefly in Chapter 5, "The Value Creation Process," and much more extensively in Chapter 15, "Getting to Know Our LCRT Model.") Today, financial data are all electronic.

Thanks to the PC, individual investors have power they never had before to work with historical information. Add vital selective financial adjustments and solid analyst research to this electronic PC power and today's models can accurately calculate intrinsic value. Why is intrinsic value important?

In today's momentum-driven market, intrinsic value is the anchor upon which future market prices migrate. Consequently, concentrating primarily on intrinsic valuation leads to investor profits!

What we seek is continuous improvement of economic, cash-based investment modeling. Investing is a highly dynamic process. Modeling never can be perfect. It can never be finished. New things always are happening.

In Chapter 5 of *The Valuation Handbook*, Professor Robert Atra mentions Allen Greenspan's comment about encountering new things that models can't explain. These are "missing variables."

Modelers have the opportunity to account for these missing variables and measure their impact on valuation. In the book, Dr. Atra describes how these new variables can be modeled. He shows how a significant correlation can be made in measuring the over/under valuation of the new driver by comparing it against any other potential economic driver. This means the variable is either the economic driver itself or it should be incorporated into the model as a proxy for the effect. The modeler will want to measure the effect directly and incorporate the driver into the model. Bottom line: There is a continuous process of identifying new economic drivers. And further, these drivers can be ranked, starting with the most important. All this improvement arises from being able to gather more data and model its impact.

As more investors become believers and more modelers jump on board, the quality grows. We become a community of investors again, not traders.

We grow our confidence to:

■ Calculate accurately companies' intrinsic values.

■ Determine the extent to which the market is under-and overpricing each company.

■ Make our investment decisions.

■ Manage our portfolios to lessen fat-tailed risk.

We move away from a market of homogeneous investors, thought to be making costless trades, developing and maintaining models that enable cheap transactions. We don't want stock prices being buffeted by a sea of investors who don't know the intrinsic value of a company, are worried about sufficient liquidity, and thus are moving in and out of their positions every couple of weeks. That is not investing. But if that is the way the

market is, we know how to take advantage of these noisy traders by being Cash-Loving Contrarians.

Imagine a market making decisions based on good calculations of intrinsic values of virtually every company. The ranges of bounded rationality would contract dramatically.

The market would have a much narrower range of prices. Possessing an information advantage would become essential to making profits. Investors again would focus on the macro, industry, and economic drivers of a company's performance that cause intrinsic value changes and create price inflection points. A key will be to assess the quality of company management.

The investment opportunities would come from those who can better understand and predict the changes in company performance and associated intrinsic valuations.

Essentially, you would need to understand what is driving the economic intrinsic value and economic price level. That is the secret.

We don't agree with investors who say that analyzing just historical fundamental accounting ratios is the right way to go. The problem with this approach is that it fails to understand causation. Regressing price change against a bunch of factors without considering causation is a mistake.

Whether they know it or not, investors using Value Line, *Investors' Business Daily,* and the products of the American Association of Individual Investors are implicitly relying primarily on a multifactor approach. Most investors instinctively understand the wisdom of relying primarily on causation, but they try to get more comfortable by adding more factors that they think are increasing accuracy. If they are uncomfortable with five factors, then 10

will be better. If they think fundamental data do not capture all the price changes, they add momentum factors, and if that doesn't work, why not weather changes? (Just kidding.)

To truly understand price change, we believe you need to understand price and intrinsic value levels as functions of their economic drivers. Factor models focus on price change in a statistical regression sense and not in a causation sense. In the academic world, this type of regression approach is called data mining and is considered very dangerous. We focus on price level in an economic driver sense and strongly consider the causes for economic outperformance. We know that stock price changes regress nicely against economic performance on a long-term basis. The secret is what drives our economic performance.

Multifactor fundamental and momentum modeling remain the choices of most active investors today. Our intent is to convince some of them and you that it is worth taking the time to test our automated DCF model, which relies on price levels. We believe that a comprehensive analysis of this model will be persuasive.

KEY TAKEAWAY

A focus on the economics of a business and its cash flow leads to holding stocks longer. Longer-term investors help make the market more efficient.

The market increasingly has become more short-term driven, because of the widespread use of models built on price momentum and change and not on price level. These noise traders create opportunity for true investors.

True investors narrow the ranges of price and risk, helping to build a more efficient market. Good information gives investors an advantage. Bottom line: The key is to understand price level, not price change.

CHAPTER 4

Analyzing Mental Models

It's all about value.

We hesitate to call it shareholder value because that phrase has come in for some criticism lately.[1] It also constitutes an incomplete idea.

Value applies much more widely than being limited to shareholders, with *share* implying equity holders. Value is equally important to debt holders, analysts, brokers, and others in the investment business. It most certainly applies to the company management and employees.

It is our hope and intent to interest all these audiences in this book.

We believe they should find insights in this book about the investment process and how to increase value. Policy makers as well may care about the implications of these insights as they apply to the structure of the capitalist system. That system certainly has prompted considerable comment and criticism lately.

In this book, we are proposing a simple, yet powerful continuing scientific process. Despite its simplicity, the process becomes most challenging to implement well. Also, the process is likely to be controversial. Investors, analysts, academics, and corporate executives are strong believers in practices that have been in use for quite some time now.

This book incorporates empirical research and the associated theoretical framework for the first time for many of the issues involved. To identify where managements and investors position themselves in this process, we have conducted an extensive set of interviews of companies and investment institutions. These interviews reveal how investors and managements think about their decisions, where those decisions share similar views of the world, and where they differ.

The scientific process breaks down into four simple steps: **1.** Define mental models of how the stock market behaves.

2. Empirically validate these mental models for the company, its peers, and the universe.

1Mike Mauboussin in "It's All about Managing for Value" articulates the debate in the best way we've seen: http://contenta.mkt1710.com/lp/26966/115068/

D9309.pdf.

3. Integrate strategic planning, budgeting, marketing, performance evaluation, compensation, and other business processes with the empirically validated intrinsic value models and associated stock market behavior.

4. Effectively communicate the results to investors so the stock price reflects the intrinsic valuation of the company's historical performance and strategic plans, while contracting the noise around those intrinsic values.

We focus on defining the mental models of stock market behavior in this chapter. No model is perfect. It never has been and never will be. We all have beliefs, using our mental models to carry them out. Whether we like to admit it or not, our beliefs, or mental models, guide our decisions.

Trying to make our mental models explicit enables us to conduct empirical tests to validate the models against the real world. For tests to function, we must have ways to measure how close we are to real-world actual price data. As you will see through reading this book, exceptional effort has gone into empirically validating our modeling process.

As Karl Popper2 suggests, mankind's progress proceeds as our models become closer to the truth. Progress is a process, because no model ever is perfect. Over time, scientists design better tests with better measurements, resulting in more comprehensive models.

Our extensive research identified numerous models. We cite the main ones here:

1. Price momentum.

2. EPS surprise traders.

3. Multiple valuations (factors).

4. Earnings models.

5. Cash flow models.

6. Accounting return and economic value added (EVA) models.

7. Net free cash flow discounted cash flow models.

8. Cash return models.

9. Behavioral or technical sentiment models.

As investors, you may be familiar with these models, probably can describe each, and likely are using one or a combination, adding your own variations in managing your portfolio.

One lesson for sure from this research is the plethora of models in use. It shouts loud and clear that the often-made academic assumption of

2Karl Popper, *The Logic of Scientific Discovery* (Routledge, London and New York, 1992).

homogenous expectations is not supported by reality. Consequently, the stock market is not efficient.

Another real-world truth involves corporate management practices today. Companies may use capital budgeting techniques to evaluate their projects and candidates, but they often revert to earnings estimates to communicate to investors and respond to analysts. This inconsistency in mental models and communications is striking. We suspect that executives and investor relations officers are trying to give analysts and portfolio managers the information and emphasis they want to hear. Earnings do seem to drive the market today. That's a shame.

Throughout this book, we emphasize the empirical research that underlies our work in modeling stock investing and thus gives us the confidence to offer our models to you. We identify a host of examples to illustrate how to validate the models through empirical research. We have incorporated all of them into our work.

They include the following:

■ Value charts to form the baseline.

■ Analyst estimates as overlays.

■ Tracking errors to measure model accuracy (what gets measured gets done).

■ Net free cash flow.

■ 8 X EBITDA.

■ Cash economic returns to view the company's achieved capital budget performance.

■ Fading returns.

■ Value charts with multiple models and tracking errors. Please search the index or the text for the importance, utility, and calculation of *tracking errors*.

■ Cumulative tracking errors across the universe of stocks.

■ Overlaying in the model ranges of investor herd behavior.

■ Backtesting of the model to measure the migration of price toward intrinsic value based on

■ History.

■ Migration of price toward intrinsic value based on analyst forecasts.

■ Oscillation of price around intrinsic values due to investor herd behavior.

We believe that you will agree that our efforts to validate our modeling empirically are quite comprehensive.

Further, we show you how to perform the research yourself. You start with your mental models and then translate them into single-period capitalization models with fade or other effects to reach a steady state. Next,

you compare intrinsic values from the model to actual stock prices for the company at the fiscal year plus three months. Importantly, you compute the signed and absolute tracking errors between the prices and intrinsic valuations. Now you can extend the model to cover your peers and the stock-investing universe.

Our LCRT (LifeCycle Returns) modeling enables you to conduct this process. It's right here in this book.

For you and for us, the modeling is an ongoing process. The process contains the feedback loops necessary for constant improvement. You can be, and we certainly are, continuously at work to design better

empirical measurements and tests as well as more complete models with additional relevant economic drivers/parameters. The search for truth never ends; we just try to get closer.

Our interviews with corporate executives and professional investors enabled us to sort out the keys to value creation or destruction. As we indicated, the first is to integrate business operations with our model's estimates of intrinsic value. Second, compare intrinsic value against current stock price behavior. Third, communicate effectively to enable the market price to move more quickly toward intrinsic value. Managements then can apply this knowledge to actions that create value: capital structure policy, finance, operations management, buybacks, and others.

Investment managers have an excellent opportunity to encourage executives to create value by sharing (reconciling) the mental models and by conducting effective ongoing dialogue. It's sad that the models used on Wall Street are so far apart from the conceptually sound, strategic cash flow models that are employed within corporations. We strive to help you consistently make your portfolio investments on the identical basis of the internal models utilized within sophisticated corporations.

KEY TAKEAWAYS

1. Multiple mental models employed by investors refute the traditional academic assumption of homogeneous expectations. Not everyone is utilizing the same model.

2. Empirical evidence can measure the "goodness" of the models. LCRT

provides extensive empirical evidence.

3. Stark inconsistency exists between the capital budgeting and strategic planning models used within corporations and the models used by outside investors. These models should be consistent.

CHAPTER 5

The Value Creation Process

This chapter reviews a few core concepts and terms that we will employ extensively later. On purpose, we are not going into an extensive academic treatise on these concepts and terms here.

Cost of capital is the weighted average cost of both debt and equity. Its estimation is controversial. We will explain our methodology for estimating it later. We'll compare methodologies.

Most fundamentally, however, corporate managers use cost of capital to discount future cash flows to the present to calculate the value of a project, the value of a business, or the value of a strategy.

Then, they calculate a return on capital in order to compare the project to the cost of capital. Projects, businesses, or strategies that produce returns above the cost of capital create value for the shareholder. Returns below the cost of capital destroy shareholder value.1 It's that simple (well, almost).

Funny, a large majority of investment techniques on valuation don't even mention the cost of capital or the firm's return on capital. Please take a look at Yahoo Finance on the "Valuation Measures" tab. You'll see market capitalization, enterprise value, trailing P/E, PEG ratio, price/sales, price/book (enterprise value)/revenue, and (enterprise value)/EBITDA. These are simplistic valuation measures, shorthand proxies for the underlying causations. By proxies, we mean simplistic comparable ratios. These ratios are a result of present values of cash flows, not the economic driving forces—like returns on capital and cost of capital. With the power of computers today and electronic financial data, there is no reason not to list return on capital, cost of capital, and the difference between the two under 1For one well-articulated statement of this economic principle, please see Bartley J. Madden, *Wealth Creation: A System Mindset for Building and Investing in Businesses for the Long Term* (John Wiley & Sons, Inc., Hoboken, 2010), p. 48.

valuation measures. To be complete, those three measures ought to be on Yahoo's "Valuation Measures" tab.

Economic profits (EP) are the difference of the returns on capital (ROC) less the cost of capital (COC) times the capital (C). Please see Equation 5.1.

Equation 5.1 Economic Profit

$$EP = (ROC - COC) X C$$

Positive economic profits are good for shareholders. Negative economic profits are bad.

One final thought here: Please note the sharp contrast. Users of valuation ratios, like P/E, implicitly assume a regression toward the mean—say the industry median. If the P/E is too low, it likely will go up. If the P/E is too high, it likely will go down. To our knowledge, there is no empirical research that P/E ratios regress toward the mean. This is probably due to all the ways to calculate earnings and the noise that is in stock market prices.

It may be due to a reluctance to empirically test the implicit assumption of regression toward the mean to find out if P/E ratios actually work to predict price future movements.

We simply say compare the price to the firm's fundamental intrinsic valuation, not to the overly simplistic industry P/E valuation ratio. The intrinsic valuations derived from the present value of cash flows produced from returns on capital discounted at the cost of capital are the fundamental economic drivers of shareholder value. We do see market price regress to the intrinsic value calculated in this manner. The intrinsic valuations of various DCF models ought to be on Yahoo's "Valuation Measures"

tab and the tabs of all other portals of information used by individual investors.

THE IMPORTANCE OF ADJUSTING FOR INFLATION

Most prices increase with inflation, so the physical output produced by depreciating assets will remain nearly constant while their prices increase in nominal dollars over time. To get an accurate return on investment, the historical dollars invested over time must be adjusted for inflation.

Consequently, we apply knowledge of the depreciating asset's age to estimate the general inflation faced by the investor to restate past purchases in historical dollars in today's dollars. This inflation adjustment enables us to compare the cash flow generated by the business to the investors' cash invested in the company's depreciating assets, all expressed in the same

units of investor purchasing power.[2] Thus, our return on capital measure is a “real” (inflation-adjusted) one.

We think that the depreciated asset historical cost is not a good number to use in the return on capital calculation. Most depreciating assets do not lose their ability to generate almost full output until their final life is reached.

What we are saying is that the economic output tends to be steady on an inflation-adjusted basis.[3]

The change in return on capital tends to revert to a country mean due to competition and because every firm has access to similar technology. What we see is that a high return on capital tends to fade down toward the mean and a low return on capital tends to increase toward the mean. We will deal with this return on capital fade later in the book.

WHERE WE ARE GOING

We offer six key factors to truly produce the least biased return on investment measure.

1. The company’s return on capital measure should be based on cash flow, not earnings. Please don’t get us wrong. The firm’s earnings are usually one of the largest and most variable components of cash flow, but they are not the only one. We’ll need to add back depreciation and amortization to return to cash flow (among other adjustments) a firm can truly use to invest in new capital projects.

2. Our capital measure should also be based on the cash invested in the business, not the depreciated book value. We’ll add back accumulated depreciation to return to the cash invested in the corporation on behalf of investors.

[2]This is a purchasing power inflation adjustment advocated by Bartley J. Madden and Yuji Ijiri to produce a return achieved on the investor’s actual cash investment, not a replacement cost adjustment to achieve a hypothetical return unrelated to the investor’s experience. Therefore, this adjustment for general purchasing power even applies to depreciating assets where replacement costs are declining, like computers.

I would rather be approximately correct with asset age inflation adjustments than precisely wrong using historical cost.

3Put another way, the economic output does not decline with the increase in accumulated depreciation. Declining with the increase in accumulated depreciation is a necessary assumption for the return on depreciated assets using net income to equal the internal rate of return of the project.

3. We assume the output from assets follows a "one-horse shay" pattern, namely, the output continues until the end of the asset's economic life and then it ceases completely. This is not a perfect assumption, but it is better than the one implicit in return on depreciated capital measures.

Return on depreciated capital measures implicitly assumes that output declines with the increase in accumulated depreciation. Just think of your car. Does it achieve 30 mpg in year one, 25 in year two, 20 in year three, 15 in year four, 10 in year five, and five in year six? No! The 30

mpg gradually declines, maybe toward 25–27 at the end of the car's useful economic life.

4. As we said above, most prices increase with inflation, so the output produced by the asset remains reasonably constant on an inflation-adjusted basis. We apply knowledge of the asset age to estimate the general inflation faced by the investor to restate past purchases in historical dollars in today's dollars. This inflation adjustment enables us to compare the cash flow generated by the business to the investors'

cash invested in the company's assets, all expressed in the same units of investor purchasing power. Thus, our return on capital measure is a

"real" (inflation-adjusted) one.

5. We call our return on capital "cash economic return" to distinguish it from other traditional measures.

6. To be comparable, our discount rate also must be "real" or inflation adjusted. Instead of a traditional "risk" adjusted cost of capital, we

determine the one unbiased ("best") real discount rate each year that equates all the stock prices in the universe to their present value of the cash flows. We call this real discount rate the market-derived investor's real discount rate, or more simply the market-derived discount rate.

We don't incorporate risk into the discount rate, as traditional valuation analysts do. Hence, we incorporate risk into the certainty equivalent cash flows. This is a fancy (academic) way to say we lower the present value of the cash flows to reflect increased financial leverage risk, instead of raising the discount rate utilized in most traditional approaches.

We do not use a traditional CAPM beta-adjusted discounted rate, because we want our real discount rate to be internally consistent with our DCF intrinsic valuation model.4

4Put another way, we want our real discount rate to be internally consistent on a DCF intrinsic valuation level, not based on a separate inconsistent theory of risk based on price change. Later chapters cover extensively this most important empirical difference of inconsistently basing theory on price change instead of the more fundamental theory of price level.

We will discuss this in more detail in "Looking at the Discount Rate"

in Chapter 15.

KEY TAKEAWAYS

1. In the longer term, companies create shareholder value by investing in strategies that produce returns on capital above the cost of capital.

2. Returns on capital should be based on cash flows and the investor's cash investment in the firm's assets, not earnings and depreciated assets.

3. Costs of capital and investor return requirements should be based on the valuation model, not CAPM beta-adjusted ones.

4. Both returns and costs of capital should be inflation adjusted or "real,"

not based on historical cost.

CHAPTER 6

The Corporate Perspective

This chapter is written primarily for the managers of businesses whose equity and debt form the securities markets. Vitally, we believe the mes-sages presented here are just as important to the investment community. It has been our goal, indeed our dream for the past three decades, to encourage corporate managers and investors to apply the same valuation principles and methods in pricing stocks and bonds.

Thus, our framework for modeling value concentrates on two prime audiences—investors and company managers. We believe it is equally important to apply the thinking, process, and methodologies to the business side—namely, how our corporations are managed. In this context, we view our economic, cash-based foundation serving as an excellent tool for business management.

Imagine the benefits of having both the investment and corporate communities working from the same template. It forms a clear picture that everyone can follow. Executives base their decisions and management processes on fundamental economics, namely, cash flows. Decisions on strategies, business unit performance, financial structure, and compensation are all based on cash returns from existing assets and new cash investments.

In this joined world, investors' stock portfolios follow the same economics-based foundation. Metrics to measure results are common in the two constituencies. Managements possess a good understanding of how investors will react to material events involving strategies, key initiatives, financial moves, and more.

Bottom line: Investors and management teams relate business performance and prospects to stock price more accurately, enabling companies to truly create shareholder value.

THE FOCUS FOR BOTH CONSTITUENCIES:

VALUE CREATION

Corporations would use the same basic model, importantly joining managements and investors in the value creation process. Executives would have 33

insights into how major investors are reacting to strategies and progress.

They are anticipating actions and results. Surely, this knowledge influences corporate decisions. Investors would better understand how management thinking and behavior are affecting growth in value. Management and boards of directors would clearly communicate the results from shareholder value reviews (SVRs) to company investors.1 The shareholder value review is a process created by the brilliant Bart Madden. It is described fully in his book, identified in the footnote below.

SVRs would compel boards of directors to better meet their responsibilities to shareholders. Briefly, an SVR voluntarily included in a firm's annual report would have three major components: (1) a description of the valuation framework used for corporate decision making; (2) consistent with such framework, the display of value-relevant track records for each of the firm's major business units; and (3) consistent with such track records, board discussion about management's strategy and reinvestment plans.

Implementation of an SVR likely would raise stock prices for most firms due to expectations of improved future economic performance from the decision-making discipline promoted by SVRs. So, what is holding up this corporate governance innovation?

The roadblock is the mindset of managements and boards that espouse long-term wealth creation but make decisions with an eye on short-term stock price changes and quarterly earnings. If the corporate world understood and embraced the ideas about intrinsic value presented in this book, SVRs likely would be implemented to the benefit of long-term wealth creation.2

Now, we need to know what single, least biased, company return on capital performance measure can form the core for shareholder value reviews. We recommend the LCRT cash economic return (CER).

}Already, companies and investors are on the same page in applying this metric. Perhaps they don't realize it. Cash return on cash invested (LCRT's CER) is the equivalent of an internal rate of return (IRR). Companies use an IRR as the basis of allocating capital. We highly recommend using the 1Bartley J. Madden, *Wealth Creation: A Systems*

Mindset for Building and Investing in Businesses for the Long Term (JohnWiley & Sons, Inc., Hoboken, New Jersey, 2010).

2For an excellent discussion of how a transformed investor relations function can effectively articulate the continuing application of these shareholder value review principles, please see William F. Mahoney, "Optimizing the Value of Investor Relations," *The Valuation Handbook* (John Wiley & Sons, Inc., Hoboken, New Jersey), pp. 544–558.

cash economic return method to replace the more standard IRR accounting approach. When a company's stock price matches expectations of intrinsic value, capital is allocated more efficiently. When economic returns become the basis of managing the business, the process can be rolled out throughout the company. The process flows right down through the shop floor or through the basic service functions, depending on the nature of the business.

As managers work with their stock price formation process, they become able to more tightly define their company's intrinsic worth. This leads to determining how best to continue creating more value for shareholders.

Using this meaningful metric enables executives to see how new investments will continue to create value. Executives can calculate the cash economic returns on those new investments.

At the same time, investors gain a better understanding of the expected cash economic returns on those new investments, as well as the cash economic returns on existing assets. Investors and management have the identical point of view, the same basis for measuring economic performance.

We are moving beyond earnings to place increased emphasis on the balance sheet, because the balance sheet quantifies the cash investments in the business assets.

Managements' intrinsic value analysis contribute to their better understanding of the change in their company's stock price. The price formation process relies on an intrinsic value analysis. You must understand the appropriate price *level* to understand what is driving price *change*. An intrinsic value analysis is an absolute process; factor models are relative and reactive, simply identifying a possible cause of

change. Frankly, factor models provide management little to no guidance on precisely how to create shareholder value based on the fundamental economics of the business.

Our key is to link price level to price change. We are analyzing sets of fundamentals in arriving at that answer. Our smart investors and corporate managements analyze fundamentals, while those investor-traders just react to prices, price trends, and patterns.

Using the same measure builds consistency within the company in managing various key business elements. There exists a major disconnect today at most companies in their financial structure. It is common at companies to use a different basis and metric for capital budgeting, business unit performance, and compensation. It makes more sense to link these through the same primary measure.

Truth is, a consistent approach—for corporate managers and investors alike—is more important than having the perfect model. Indeed, there is no such thing, even though we will be forever working at improving the best one we have currently.

EARNINGS ARE THE WRONG MEASURE

Companies seem to be totally caught up in the emphasis on earnings as the primary measure of corporate performance and basis for valuing a business.

It is the wrong measure. We want to prove this truth to all corporate executives with the hope and expectation that a fundamental change to cash as the basic measure will result. When common sense is applied, we continue to be baffled over the investment world's dominating focus on earnings.

In an investment world that appears to be driven by earnings, only the wisest seem to understand that it is cash flow that really matters in running a business and also in selecting companies with the strongest fundamentals and prospects in managing a portfolio of stocks.

There is true wisdom behind the notion that businesses, investors, indeed all the individuals comprising society, are driven by their ability to generate cash from sales and a job. Cash is used to pay the bills, make purchases, and invest in the future, whether that means

continuing to expand and grow by generating more sales, or buying a house and raising a family.

Earnings, on the other hand, are an accounting convention, and accounting has been very accommodating over time in enabling companies to show financial results that don't accurately portray the economic condition of the company.

Earnings as the metric of choice primarily drive the market today. Scholars write articles and books endlessly about earnings. Professional investors focus their models on earnings. And lately, TV and Internet media can't seem to talk about much else than earnings. Why? Because it is the easier way to go.

There also seems to be a growing legion of investors trying to capitalize on the volatility of the market, caused at least in part by the short-term move of corporate earnings up and down. Short-term investing models, often driven by rather sophisticated trading practices, aided by rapid advances in technology, have become a large factor in the U.S. stock market today.

Homogeneous investors believe in something and build critical mass.

Earnings are a prime example. Thus, the stock market is driven by earnings.

Actually, we are encouraged by the reality that investors follow trends.

We want investors to embrace our recommended method, grow it into a trend, and then have it become the dominant way of investing in the equity of companies.

Earnings as a base measure of business success is well suited to a stock market that has become the source of an intense pursuit of personal profits.

More people today seem to be in it for quick gratification, ready to act in a flash to lock in gains and cut off losses. In this current scenario, greed rises to new heights, followed by fear when the gains and/or original capital start

to disappear. Risk should be highly important to investors, but it sometimes gets forgotten in the rush to greed.

That leads to earnings as the preferred metric in a world seeking optimal gains. Stock market players scream for more earnings. Rising earnings almost certainly generate a higher stock price.

This focus on earnings has only grown in intensity, encouraged significantly by brokerage analysts estimating quarterly EPS results, continually revising their forecasts higher or lower, often supported by guidance from companies. In this way, the brokerage analyst community has exacerbated investors' sense that earnings matter more than any other measure. Sell-side analysts literally keep the short-term performance of thousands of companies in the spotlight by estimating quarterly earnings per share and changing those forecasts at will. The market is flooded daily with analyst updates, revising companies' earnings up and down.

As a result, institutional investors have been encouraged to build multifactor models that stress earnings, especially revisions, accelerations, and surprises. Earnings factors have become important inputs among the chief factors driving investors' models. Investors know that an earnings surprise will change a company's stock price, and it will happen quickly and maybe even dramatically.

Corporate executives have come to believe that earnings are all that matter to investors and analysts. This attitude only is reinforced by the plethora of questions about earnings performance and expectations that dominate quarterly conference calls and CEO/CFO presentations.

No wonder the emphasis on earnings likely leads stock market volatility.

It also leads to the short-term investing mentality that people often complain about, but either gladly or reluctantly participate in, depending on their investing time horizons.

Earnings are more volatile than cash, causing investors to buy and sell stocks more often. Indeed, as earnings take over the market, investors succumb to the temptation to move in and out of stocks quickly in seeking and locking in gains. Sell-side analysts favor earnings because they are more volatile than cash flow. This volatility causes investors to trade more frequently, thus generating commissions for the brokerages and trading specialists. All this leads to a stock market that is more short term in its horizon than ever before, and continuing in

that mode.

Faced with frequently reported earnings numbers, major swings in those numbers from quarter to quarter, changing estimates, and revisions on a daily basis, jittery investors tend to overreact. That's what happens when market behavior is based on earnings. That's what happens when earnings results don't meet expectations. That's what happens when analysts revise their forecasts downward.

Or, opportunistic investors overbuy based on positive earnings, good earnings acceleration, or a favorable earnings surprise.

We have accounting standards to blame for this unseemly affair with earnings. Investors' love for earnings is rooted in accounting principle and practice. It all started ages ago with the accounting principle to determine net income. That became the standard and it has stuck. We shouldn't want to be stuck with it. Clever accountants have devised numerous ways to manipulate earnings, even embedded in accounting principles and methods.

What investors are much better off doing is calculating the intrinsic value of the company. That value becomes the basis for making investment decisions. When understanding the true value of a business, investors can determine whether the current price means the company's stock is being fairly, over-, or undervalued.

EXECUTIVE COMPENSATION

Fairness is the major principle at work in determining proper compensation for the people who run businesses—executives, managers, and all the employees. Fairness also applies to the company's investors. Executives, managers, and employees should be compensated based on the value provided to society and to shareholders.

Compensation is an integral part of the shareholder value process. We have our ideas on what constitutes fair compensation. We briefly describe some core principles and key references. Our framework of reference is the extensive empirical evidence in market inefficiency and price over reaction outlined in this book.

Executives and managers work for their company's shareholders.

Therefore, corporate managers are the shareholders' agents. We have seen how they don't always share the same economic interests. Shareholders desire to see their stock price rise, while managers may care more about their base compensation and bonus, based on things within their control. Michael Jensen wrote eloquently about the "agency" problem or challenge between corporate managers and their firm's investors.3

3Michael Jensen well articulated the management "agency" problem. Please see his

"Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers," *American Economic Review*, Vol. 76, No. 2, May 1986, pp. 323–329. Please also see Michael C. Jensen, "The Takeover Controversy: Analysis and Evidence," *Journal of Applied Corporate Finance*, Winter 1994, pp. 6–32.

Jensen's research formed one foundation for leveraged buyouts to force management to disgorge excess cash to shareholders to improve corporate return on capital profitability.

The simplistic way to align managers' interests with shareholders appears to be executive stock options. After all, stock options increase manager wealth as shareholder wealth increases. This is true, as far as it goes. However, it does not go far enough. The challenge is far more complicated, because we are dealing with emotional human beings—both within the corporation and outside the corporation.

Unfortunately, as we illustrate in this book, the market is not perfectly efficient over most practical time horizons for many portfolio managers and traders. Much noise exists in stock prices. Prices overreact to news events.

And, very importantly, security analysts continually ask executives what their EPS is going to be next quarter. Then the market prices overreact if the firm does not make those EPS "Street" estimates.

We sense that far fewer analysts and portfolio managers engage company executives in deep conversations on the firm's returns on capital achieved on their existing strategies and anticipated on their new strategies.

By the way, we think owners of companies should discuss returns on strategies with their agent executives—for example, on webinars, so all have access to the information simultaneously.

Company executives often complain that the stock market is short-sighted, overreacts, and fails to appreciate a focus on executing good strategies well. The CFA Institute has conducted surveys to illustrate investor preferences for long-term performance, but those results can be drowned by the phone calls asking for next quarter's EPS.

Executives are human beings who respond to feedback from people—especially their investors and analysts who cover their firms. No wonder executives feel that they need to satisfy both short-term EPS street estimates and long-term strategies simultaneously.

Therefore, every call made by an analyst or portfolio manager asking for next quarter's EPS from a company is getting the behavior desired—mainly a focus on the short-term attainment of EPS instead of effectively executing long-term strategies. If that behavior is not what you want, start to ask questions about returns on capital on existing strategies and new strategies.

I know this requires more time, but may be more rewarding to increase your investment in the long term. This change in communications approach will encourage your agent managers to concentrate their efforts on the "right" thing—namely, executing wealth-creating strategies—not on next quarter's EPS.

The four problems with executive stock options are that they: **1.** Can pay executives for the short-term noise in the stock market.

2. May encourage short-term focus on EPS, unfortunately to the exclusion of executing long-term strategies.

3. Are not explicitly linked to those things under management's control.

4. Do not reward senior executives directly for focusing on new wealth-creating strategies.

I am not saying that stock options should be removed from the executive compensation package. I am saying that other elements of the pay package can more clearly signal to executives more precisely what they need to do to change things under their direct control.

Taxes, monetary policy, government expenditures, trade policy, housing policy, and so on are not under managerial control (although they may have some small influence with their firm's lobbying efforts). Yet, these macro drivers, relevant to tactical asset allocation by portfolio managers, do impact stock price. Witness how housing policy, well intended, but without realizing the unintended consequences of not verifying borrowers' incomes, produced an economic meltdown second only to the Great Depression.

We suggest—in fact, strongly recommend—that a deep understanding of the company's economic drivers of intrinsic valuation can form a sensible basis for executive compensation.

This shareholder value review (SVR) approach can form the core for implementing an intrinsic valuation approach to executive compensation.

SVR does not even need to rely on the LCRT framework. Any valuation framework that concentrates on returns on capital over the cost of capital likely will be better than just earnings. This is because it crucially helps management focus on the balance sheet in addition to the profit and loss statement.

I once helped an executive compensation consulting organization design a pay plan for a firm close to bankruptcy; the firm didn't even recognize how precarious its financial situation was! A simple executive pay matrix with returns on sales on one axis and capital turnover on the other helped to shift management focus toward the balance sheet to save the company from bankruptcy.4 All of a sudden, slow-moving inventories and late receivables evaporated because of the capital turnover element. Before implementing this plan, management had only focused on margins (earnings over sales), which led to their precarious financial condition from a bloated balance sheet.

The example above illustrates a core principle of good compensation design: Design around the drivers of intrinsic valuation that are within management's control. These include things like customer acquisition, retention, 4Actually, we translated the margins and capital turnover elements into cash economic returns and associated intrinsic

valuations. The bonus payments were proportional to the change in intrinsic valuations.

and profitability. Calculate returns on capital for each customer class and each product class. With computers and enterprise management software, profitability by customer and product now has become possible—although admittedly not trivial.

I recommend three additional compensation design elements for your consideration.

First, create clawback provisions that collect excessive compensation later revealed when things blow up. For example, bonuses paid on subprime mortgage originations would be recaptured when the subsequent losses began to become obvious.5 It's a good idea to give investors a "say on pay" through the proxy process on the clawback provisions and intrinsic valuation models employed.

Second, pay senior executives on the intrinsic valuation created from new strategies effectively executed. These payments can be based on intrinsic valuation models that divide the cash flows into those coming from existing assets separately from those derived from future investments (Miller-Modigliani separation). The concept is to reward senior executives more for executing new strategies than simply maintaining business as usual on the existing strategies and associated assets.6

Third, pay your "stars" much more than others, consistent with your company's culture of recognizing all contributors. Retaining these pivotal employees and hiring new ones actually improves shareholder return.7

CREATING AN INFORMATION ADVANTAGE

It is surprising to us that many managements do not utilize their investor relations functions as fully as they should. Investor relations can play a vital role in helping enable the market to price the company's equity and debt at fair value—at the intrinsic value.

Investors using the price formation process depend on possessing the best information possible to conduct their intrinsic value analysis in order 5The amount of the clawback can be directly related to the loss

of intrinsic valuation from restating returns on capital to reflect the abnormal accruals for losses not properly accrued originally. The auditors get to perform this restatement work, which is obviously unpopular with managers.

6Please see innovative research performed by Mark Van Clieaf on rewarding executives more for new strategies than maintaining existing ones.

7For an excellent discussion on pivotal employees, please see Mark Ubelhart,

"An Economic View of the Impact of Human Capital on Firm Performance and Valuation," *The Valuation Handbook* (John Wiley & Sons, Inc. Hoboken, New Jersey), pp. 508–543.

to gain insightful knowledge of strategies, major initiatives, and the values of intangibles. Smart investors always seek an information advantage.

This search is clearly what happens with the most successful professional portfolio managers and analysts at any time. Essentially, they are evaluating whether the company has a smart investment strategy and is conservative with accruals. Smart corporate managers also rely on having the best information possible.

Gaining an information advantage takes a lot of work. It means being thorough in reading and analyzing what is readily available from companies, analyst research, and the media. However, primarily, it means going beyond public information to be in regular conversation with companies, analysts, their representatives, and other investors.

Most of all, it means devoting considerable time to analyzing the data and information with a mind searching for deeper insights. Discussions with the few investors and researchers who understand these principles can help.

Even many professional investors don't take their work that far.

Information advantage leading to better stock selection enables investors to hold fewer stocks in their portfolios. Modern portfolio theory builds the case for sufficient diversification to reduce the risk

of picking a few stocks whose prices fall. That may be fine for professional investors, but how many of you have the time or money to hold a portfolio of 50 to 100 stocks or more? The research is a full-time job. The costs of investing in the stocks and then conducting a realistic amount of trading can be overwhelming.

The opportunity to outperform the market is driven by a process that incorporates an effective intrinsic value analysis, coupled with applying the best information in evaluating a company's strategies, actions, intangibles, and macro drivers, while calculating risk and fade. In other words, it centers on using our model.

Our friend who runs a portfolio of about 20 stocks and has consistently achieved returns above the market thrives on information. He is in constant contact with senior corporate executives and well-informed investor relations officers. He knows which analysts glean the best insights on certain companies. He is a student of corporate financial and annual reports and an avid reader of selective media. He devotes the time to do the analysis and thinking.

Corporations are smart to function as reliable information resources.

We're talking about a lot more than financial transparency here. A good example is accruals. Accounting watchdogs like Howard Schilit8 are suspicious of certain ways to account for accruals, restatements, and actions to 8Howard Schilit, *Financial Shenanigans: How to Detect Accounting Gimmicks*

& Fraud in Financial Reports, 2nd ed. (McGraw-Hill, New York, Chicago, San (*Continued*)

change accrual methods. Frankly, and more so than ever, they are looking to detect fraud.

The right question for companies to answer involves whether abnormal accruals are truly economic. Our model includes a value chart that enables investors and companies to calculate the effect of accruals on economic intrinsic value. The change, for example, may be totally legitimate, based on a longer life calculation of certain equipment.

What information should you seek? Here's a short list:

■ Thorough description of the basic business and how it will change going forward.

■ How the cost structure will change.

■ The company's competitive position.

■ Basic strengths and weaknesses, especially from competitive standpoints.

■ Revenues from recent new products.

■ Results of programs to reduce costs.

■ Research and status of new products in the pipeline and/or new services.

■ Results of recent expansions and plans/timetable for new expansions.

■ Recent capital spending and CAPEX plans.

■ Areas of rising costs and reasons.

■ Effectiveness of sales and marketing efforts, plus anticipated changes and reasons.

An information advantage is key to picking stocks. The efficient market theory (EMT) suggests that all relevant information is perfectly reflected in the current stock price or, at least, no consistently profitable strategies can be constructed. Its weakness is that it doesn't recognize the information advantage. Investors gain that advantage by finding ways to obtain/gather the most valuable information, beyond what others have. They transform that information into knowledge and insight that is superior to that of others. No one can predict the future—neither investors nor managements.

The best we can do is to have the most in-depth, insightful knowledge of a company possible. That starts with information superior to what the market has, that is, an information advantage.

With *ValuFocus Investing*, we deliver an information advantage to you.

This information advantage relies on extraordinarily extensive empirical (*Note Continued*)

Francisco, Lisbon, London, Madrid, Mexico City, Milan, New Delhi,

San Juan, Seoul, Singapore, Sydney, Toronto, 2002). Also see Scott A. Richardson, Richard G. Sloan, Mark T. Soliman, and A. Irem Tuna, "Accrual Reliability, Earnings Persistence and Stock Prices," *Journal of Accounting & Economics*, Vol. 39, No. 3, September 2005. Available at SSRN: http://ssrn.com/abstract=521062.

research into accurate intrinsic valuation models that display lower risk to produce higher returns.

KEY TAKEAWAYS

1. You, as the investor, and your corporate manager agents should employ identical, empirically validated principles to make your investments.

ValuFocus Investing bases itself on identical principles that reflect the internal rates of return (IRR) of all the projects in place within a corporation to model likely future cash flows in a competitive economy.

2. A market focused on short-term earnings instead of cash flows contributes to significant inefficiencies in the capitalist system. We need a better way. Until the market "wakes up" to a better way, you may increase your equity investment returns by buying from or selling to less knowledgeable investors or traders. Please consider understanding the *ValuFocus Investing* framework and employing the ValuFocus tools to achieve higher returns with less risk.

3. Executive compensation would improve with a greater emphasis on the economic drivers of intrinsic valuation,9 less emphasis on stock options, and elimination of earnings instead of cash flow as a primary element. It also should include clawback provisions for risks gone bad and reward top executives more for value creating new strategies than running the existing business.

To beat other equity investors, you need an information advantage of a better framework and better tools.10 This book describes that framework and offers those tools.

9Return on capital devoted to retaining and attracting customers, growth in profitable investments, and so on.

10Also see "It's All about Managing for Value" by Mike Mauboussin, chief investment strategist at Legg Mason Capital Management: http://contenta.mkt1710.com/

lp/26966/115068/D9309.pdf. It is one of the truly best statements I've read about creating shareholder value. In it, he clarifies what it means to create shareholder value—and the surprising controversy about how it should be defined. Here are some highlights:

—Why shareholder value should be measured over the long term—and why creating enduring value is not the same as boosting the stock price.

—Why what often passes as corporate strategy is not strategy at all.

—How cognitive mistakes can lead executives astray and what can be done to mitigate them.

Section

Two

A Brief History of

Investing and Modeling

Because we strongly believe that we all honestly "build on the shoulders of giants" and you should know the history behind our efforts in this book, we have provided the chapters in Section II as important background to your investing process.

This section also should help you more effectively evaluate the techniques that you currently use.

Chapter 7: Relevant Market History of Investing 1. Modern portfolio theory led to asset pricing models of price change.

2. Since one factor, CAPM beta, seemed not to be sufficient, people added more factors.

3. Much of the research relied on earnings, instead of cash flow, balance sheet investment, and return measures relative to a cost of capital.

4. Although somewhat predictive, multifactor models tend to possess unstable parameters that shift over time in poorly understood ways.

This instability can lead to inaccurate predictions of likely price change versus models based on fundamental discounted cash flow intrinsic valuations.

Chapter 8: Interpreting Market History

1. Focus on investable cash flow instead of earnings and intrinsic valuation to estimate price level before estimating price change.

2. We need a new accounting principle based on intrinsic valuation and cash economic return to replace the traditional accounting principle of matching expenses with revenues to produce periodic net income. The replacement intrinsic valuation accounting principle becomes matching gross cash flows against inflation-adjusted gross cash investment to produce periodic real returns on investment, which are directly comparable to investors' discount rates.

CHAPTER 7

Relevant Market History

of Investing

Investinginstocks?Ofcourse.Allconventional wisdomsaysstocksgetyou a better return than a savings or money market account or even a bond over the long term, despite their volatility. Maybe gold, silver, oil, and other precious metals plus commodities should be in a diversified portfolio. And there is real estate. It should produce investment gains when the economy is in good shape.

If we learned anything during the recent economic meltdown in 2007–

2009, it was that when things go bad, all asset classes tend to become more correlated and go down simultaneously.1 There is no place to hide to avoid risk of loss! Even cash, the ultimate risk-free asset, faces the uncertainty of inflation. Two of the worst years for T-bills were 1946–1947

when unanticipated inflation wiped out over 28.4 percent of investors'

purchasing power after the removal of WWII price controls. After WWII, most economists expected a depression, not inflation.

Now at the present, what do we fear? To avoid inflation, can the Federal Reserve, at just the right time, squeeze out just the right amount of excess liquidity so that it floods the worldwide economic system to avoid letting the housing crisis turn a deep recession into another depression?

However, equities are likely to be at or near the top of any list of favored investment return options over time, despite those dark economic and/or political times that make us live through down stock markets.2 So 1For an outstanding discussion of this effect and the meltdown itself, please see Frank J. Fabozzi, Sergio M. Focardi, and Caroline Jonas, *Challenges in Quantitative Equity Management*, CFA Institute, April 2008, especially p. 10: "Referring to August 2007 . . . What we saw was an unwinding of quant funds with similar positions."

Unfortunately, this outstanding research concentrated on Fama/ French multifactor models related to price change as the core instead of automated cash-based intrinsic valuation related to price level.

2In a HOLT Value Associates Research Update to clients, "Volatility 'Risk' Versus Inflation Risk," July 25, 1990, co-author Rawley Thomas demonstrated that over (*Continued*)

the next question becomes how best to invest in stocks. Schools of thought abound here too.

Statistics lovers say most of us can't do any better than the performance of the stock market as a whole, so we should stick with methods that mimic an appropriate stock index. These market returns are propped up by this notion that the market is efficient when it comes to pricing stocks. This means that the price at the moment reflects the value of the company, adequately understood because all the pertinent information is being absorbed by the collective investment community.

Thus, an investment method that enables you to match the market is your best way to go, or you may even be able to do slightly better by enhancing that model.

Yet, there are thousands of investors out there who don't believe the market is efficient, and they are confident of their ability to do better using a superior approach and model. Most of these investors use models based on a company's earnings, which have serious flaws. More on that later.

START WITH CONCEPTS OF RISK AND UNCERTAINTY

Risk and uncertainty always have been core topics in finance and investments.

Frank Hyneman Knight3 distinguished risk (randomness with knowable probabilities) and uncertainty4 (randomness with unknowable probabilities) in his famous dissertation *Risk, Uncertainty and Profit* (1921).

People still confuse the two. For example, much of the current corporate interest in "enterprise risk management" is really "enterprise uncertainty management"—events that have never happened before, but need response planning just in case they occur because of the huge potential losses.

Later around Figure 28.1, we quantify risk in a nontraditional way by employing Benoit Mandelbrot's paradigm-shifting research on fat-tailed, (*Note Continued*)

all time periods from 1926–1988, common equities always outperformed T-bills, government bonds, and corporate bonds in real terms for time horizons longer than nine years. Sadly, the lowest returns were about –5 percent average annual real rates of return. No risk-free asset exists in real terms. Even inflation-protected government bonds (TIPS) can decline when real rates increase.

"Effect of Proposed Tax Changes on Stock Prices," October 3, 1989, contained the data for the "Inflation Risk" study. Obviously, the study needs to be updated for the recent economic meltdown after the stock market fully recovers.

3See Wikipedia, http://en.wikipedia.org/wiki/Frank_Knight.

4See Wikipedia, http://en.wikipedia.org/wiki/Uncertainty.

stable Paretian distributions. We call this inclusion "producing lower fat-tailed risk."5

MIGRATE TOWARD VALUE AND MARKET INEFFICIENCY

Two camps exist: (1) efficient markets and (2) the corporate return on investment approach to produce intrinsic valuations, advocated by Benjamin Graham, David Dodd, Bart Madden, Warren Buffett, and

others. Intrinsic valuations that materially differ from stock prices confirm market inefficiency. Mandelbrot's research on fat-tailed events also is consistent with market inefficiency.

In continuing our look at history, market efficiency versus market inefficiency based on intrinsic valuations has become a long-standing battle among investors and academics.6 As you clearly know by now, we don't believe the market is efficient, and indeed, smart investors using effective models can rack up better returns. The whole purpose of an investing model is to be able to calculate the value of the company being studied. That value should be the basis of making an investment decision by comparing the present and expected value against the current market price.

The majority of investors, analysts, and academics agree that value is what matters. We can't forget, of course, those many momentum investors who are buying and selling on price change—up or down. But studying a company to determine what its stock should be worth is a process of valuation. What is the value of this company and its securities (stock and bonds)? That value, once decided, forms the basis of how to price the equity and debt.

Thus, the investment world, which includes a myriad of very smart investors and academics, has spent decades seeking to value a business and its securities in the most accurate way. It has become a process of developing theories and models, testing/backtesting, applying them practically in stock selection and portfolio management, measuring returns, and refining, refining, refining.

5The profession has long known that price changes, or, more properly, the change in the log of price level, display "fat tails." Both the left and the right tail of the distribution are significantly fatter than the Gaussian normal distribution.

6As we shall see, most all the academic research on market efficiency relies on mutual fund results of price change , which incorporate no data on intrinsic valuations compared to price level.

ENTER MODERN PORTFOLIO THEORY

Modern portfolio theory essentially dates to an article by Harry Markowitz in 1952, expanded in detail through his book, published in

1959. Markowitz taught the wisdom of diversifying your portfolio as a way to spread and lessen risk. He was the first to describe the importance of means and variance to better understand the risk-level differences among investments. He was a leader in identifying various risk factors, justifying the notion quantitatively of not putting all your eggs in one basket, but instead building a diversified, well-balanced portfolio.

We can credit Benjamin Graham and David Dodd for creating the more modern fundamental way of thinking about investment, spelled out in their famous book *Security Analysis,* dating to 1934.

These foundations led scholars and investors to develop and refine modern portfolio theory. In a very real way, it replaces the need to conduct mean-variance optimization, which was something hard to do accurately before the age of computer power. The capital market theory was much simpler and avoided the need to calculate a covariance matrix across all securities.

With modern portfolio theory, investors and academics narrowed the process to beta as the basic risk measure—again a simplification. Risk was (and is) now being based on price change, moving away from price level. Thus, the market developed portfolio theory based on price change and beta, extending it through the capital asset pricing model (CAPM), arbitrage pricing theory (APT), and multifactoring. The theory goes if one factor isn't good enough, let's have 18 factors.

This first effort to measure inefficiency focused on risk as calculated through beta. That effort became an integral part of the capital asset pricing model. CAPM generally is regarded as the first full-scale model, using just one factor. Risk is measured by regressing a company's stock price change against the market change. Beta is the risk level. A beta of 1.0 says risk is the average of market price movement. Higher risk stocks get a higher beta (1.4 as an example), while stocks performing at levels less risky than the market average earn a lower beta (0.8 as an example).

In the chronology of advancing theories, the arbitrage pricing theory came next. APT seeks to explain how stock prices react to a host of macro drivers, such as inflation, interest rates, current exchange, industrial production, and others. APT assigns betas (risk) to a stock, comparing it to a risk-free investment alternative in an efficient market. Thus, macro factors impact the stock price. The arbitrage opportunity comes in buying (or shorting) individual stocks based on how the companies are affected by the factors. APT and CAPM focus

on market risk, excluding company risk.

AN EMPHASIS ON EARNINGS, PLUS

The majority of this effort continues to focus on earnings as the basic metric to value a company. The investment/academic community has been under-playing cash flow virtually from the beginning, decreeing it as inaccurate, instead preferring to justify earnings as the base measure. Then, they add business, financial, and macro risk factors to apply to the price/earnings multiples (P/E) to make a buy/sell decision. In this way, they are justifying a margin of safety.

In this book, we show how our cash flow model overcomes these inaccuracies. We build a strong case for using the model to make investment decisions based on calculating the intrinsic worth of a business measured in economic terms, namely, cash.

While scholars and investment managers decided that earnings serve as the basis, they also realized that earnings alone aren't enough. The price/earnings ratio makes sense as a solid metric but it is insufficient. Early on, before computers, with all the data and company performance analysis done on paper, investors and academics started working with P/E ratios to get at valuation in a simple way. They didn't have all the electronic data.

Analysis and findings fundamentally were accounting-driven.

We need to remember that investing in stocks for nearly a century was done essentially by gathering information to perform an analysis and to make a decision without the benefit of computers. The computer age has elevated this level of sophistication by a high order of magnitude. Computers facilitate the ability to bring immensely more data to the fore, crunch that data in numerous ways, make meaningful comparisons, lay out a multitude of scenarios, refine backtesting, and on and on. The variations possible in the whole arena of investment modeling are infinite today. That encourages us to say take a good look at our model.

LEADING TO MULTIFACTOR MODELING

By multifactor modeling, we mean the regression of price change against a series of factors.

Earnings, computers, and multifactor modeling are fit to belong

together.

That's why, for many investors, computers are being used to enhance old methods. Investors and academics long have been on the hunt to make more of earnings. Usage of factor concepts took off as investors saw the advantage of building models around the concept. Multifactor modeling made earnings models and P/E ratios more robust and valuable by adding strength.

So investors first looked at earnings and were left unsatisfied. They started adding other considerations, such as price to sales, price to book

value, return on equity, return on capital, and more. These were mixed together, enabling investors and academics to believe they are getting a better number. It still all was focused on seeking value as the basis of stock investing.

Here is the premise: Take the P/E ratio, realize it may not be totally accurate, so add factors to make the analysis more complete and accurate in arriving at a realistic P/E. Buy the stock when it is in the value P/E range (undervalued) and don't buy it when it isn't. In this way, investors are trying to apply a risk element to the P/E, while also seeking to apply consistency, namely, consistency of earnings. If earnings are occurring consistently, the P/E should be higher and if earnings are not consistent, the P/E would be lower. Consistent earnings should generate a higher P/E. You can call this a form of value investing: making money in a market bounded by ranges.

So it was all this focus on earnings that led to multifactor modeling. It's almost stupefying to comprehend the amount of study and effort that has gone into factor modeling. Various academics and investors have developed and are working with models that range from three to hundreds of factors.

FINDING THE RIGHT FACTORS

Factor models evolved over decades. Investors use multifactor models as a way to determine which factors are driving the market at any time. Weights are given to each factor based on calculations of their relative impact. The factors driving the market constantly change and so do the weightings of each factor. Models also vary by country and

region of the world. What is working in the United States at the moment is likely to be far different from the factors and weights driving the Japanese market.7

Thus, factor models work from the basic notion that the market is not efficient. It is this inefficiency that provides opportunity to achieve investment returns better than the market. We certainly agree with that reality; 7For statistically inclined model-building investors, multifactor models suffer from a fatal flaw. Those multifactor approaches strongly tend to overspecify the modeling by including so many factors that change through time. For example, consider multifactor modeling consisting of five factors for each major industry in the United States for a decade. With 200 industries, the degrees of freedom required to drive the model is 200 industries X 5 factors X 10 years = 10,000. With 25,000 company-years, the 10,000 degrees of freedom becomes 40 percent of the company-years. No wonder these models strongly tend to become unstable.

In contrast, the model employed in this book utilizes about 10 time-varying parameters over a decade or 100 degrees of freedom, which is just 0.4 percent of the 25,000 company-years.

but economically built cash flow models do a better job of determining a company's value. Market inefficiency justifies multifactor models that help investors identify various forms of fallout from basic human behavior: greed, fear, aggressiveness, conservativeness, intelligence, skill, love, pride, conceit, self-centeredness, and more.

Multifactor models seek to turn market inefficiencies into an advantage.

They try to be smarter than the rest of us in understanding what the market is doing now and what it is likely to do in the near term. An effective multifactor model that captures market behavior accurately isn't quite back to efficiency, but the good model restores some of the efficient market theory.

DISSECTING A MULTIFACTOR MODEL

We have studied a plethora of multifactor models, with some counting factors in the hundreds. One, for example, developed some time back by DeMarche Associates (www.demarche.com), illustrates the concept. At the time, it contained some 76 factors, derived from extensive

testing that covered over 200 variables. DeMarche worked on the model for virtually three decades, exposing more than 3,000 companies to the 76 decided-on factors. This work enabled the firm to quantify exposures and values of each factor to each company. It used standard deviation techniques to build a history of values attributed to each factor.

DeMarche also calculated the extent to which each factor mean-reverted to determine decay rates. Some factors show rapid decay and affect stock prices more quickly, while others have slower, longer fade rates, affecting prices more slowly.

Each factor provides either a positive or negative payoff to a company's stock price. In this way, the company's exposure to a factor and its payoff contributes to the price. Factors can grow in a down or up direction—fading down or up.

The DeMarche and most multifactor models group the factors under two broad headings—those related to market expectations and those related to market inefficiencies. Factors related to market expectations are tied primarily to risk and liquidity influences, capturing investors' perceptions of risk. They include variability of earnings and returns, uncertainty of dividends, debt levels, liquidity, and market and economic conditions (APT

risk factors).

Factors related to market inefficiencies link closely with corporate performance, the firm's disclosure, and the projections of analysts. They focus on growth and profitability returns, namely, return on equity, return

on assets, asset turnover, earnings yield, book to price, profit margin, relative earnings growth rate, and consistency of earnings. In the model, over-and undervaluation factors essentially are related to price: earnings yield, dividend yield, book to price, and sales to price ratios. Why call them market inefficiency factors? They grow out of a combination of management actions and analyst forecasts; thus they are subject to constant change.

In the model, DeMarche combines all the factors into an equation that functions as the expected return for each company at that time. It is

the expected return of the market plus the sum of the company's exposures multiplied by the payoffs.

While definitely possessing some predictive capability for stock price movements, the problem for multifactor models based on price change is that their factor weights tend to shift in unpredictable ways. These unanticipated shifts in factor weightings cause their predictions to decline in accuracy. As a result, multifactor approaches to stock selection may be less useful than fundamental discounted cash flow models.8

KEY TAKEAWAYS

1. Modern portfolio theory led to asset pricing models of price change.

2. Since one factor, CAPM beta, seemed not to be sufficient, people added more factors.

3. Much of the research relied on earnings instead of cash flow, balance sheet investment, and return measures relative to a cost of capital.

4. Although somewhat predictive, multifactor models tend to possess unstable parameters that shift over time in poorly understood ways.

This instability can lead to inaccurate predictions of likely price change more than models based on fundamental discounted cash flow intrinsic valuations.

8In fairness to multifactor models and their popularity, Robert Haugen is well recognized as one of the leaders who created some of the best models. Please see Robert Haugen, "The Inefficient Market and the Potential Contribution of Behavioral Finance: Case Closed," *CFA Institute*, June 2010. This article was based on "Case Closed," in *Handbook of Portfolio Construction: Contemporary Applications of Markowitz Techniques,* ed. John B. Guerand, Jr. (Springer, New York, 2010) and Robert Haugen, *The New Finance* (Prentice Hall, Englewood Cliffs, New Jersey, 2010).

This article and these books discuss his 56-factor model!

In respect to all this multifactor research, we believe that a limited number of the factors likely will become quite useful in price formation models around the DCF intrinsic valuation as the anchor.

CHAPTER 8

For the last four decades, we have been in quest of a better idea of value, consistent with the reality that the market always seeks value. This value focus forms the basis of stock investing.

Let's think about this for a couple of minutes and maybe do a quick review. Academics writing books and investors building models always have felt that discounted cash flow isn't accurate, and so it can't be used. Thus, it is smart to move on to other factors.1 That movement has led to all this work on helping earnings function more effectively as the basic measure.

With earnings, the academics and investors need a margin of safety, so they add business factors, financial factors, and multiples to the P/E ratio to make a buy decision.

Equation 8.1 The Price Equation

CashFlow

Price =

1 + *Dicount Rate*

Our focus for a moment is on simplified pricing (Equation 8.1). One recent book has the professor-author trying to deal with the classic problem of how to measure risk. It is universally acknowledged that every investment contains risk, including discounting cash flow. Should the risk be in the numerator cash flow of the pricing equation, or in the denominator discount rate? This professor uses a discount rate to create a price to earnings ratio (P/E), with the E no longer current earnings but instead the present value of an earnings growth factor. We believe this illustrates the classic problem of 1As we shall demonstrate later, this inaccuracy likely relates to the biased nature of security analysts' terminal valuations, which have not been empirically tested for bias.

Removing terminal value bias enables unbiased, more accurate models of intrinsic valuation based only on historical data without analyst intervention. Then, analysts can add their insights by overlaying their one-to three-years' forecasts on top of the intrinsic valuations based solely on historical data. They end their forecasts with an unbiased terminal valuation model that has been empirically validated with

historical data.

55

the market to get a handle on what is value and how best to determine that value.

Virtually every book written on stock investing says value is the most important aspect. But investors, aided by academics, went to the accounting-built earnings formula instead of the more accurate fundamental of economic-based cash. Working with earnings, they added safety factors by using multiples. In their eternal wisdom, they are saying value is important but don't ask me how best to calculate it.

Multifactor modeling emerged as the leading process for "active"

investors. Here we are distinguishing active investors from "passive"

investors, who rely mainly on indexing market performance and returns while perhaps enhancing those models with a touch of active decision making.

Only a small portion of factor modeling is based on proxies for cash flow. Indeed, when factor modelers claim that they consider cash flow, in fact, they often employ earnings as a proxy for cash flow. These investors model the same things having to do with cash flow. However, they do it indirectly from the income statement and capital turnover, not directly from the balance sheet.

Their models are not fundamentally based on cash economic returns (CER) or cash flow returns on investment (CFROI®), relative to the cost of capital. Factor modelers don't deal with cash flow this way. They are trying to get at the proxies for cash flow without getting at the underlying economic fundamentals. For them, it is about price change, not price levels and intrinsic value.

Still, factor modeling is important to understand and consider in our modeling, because it can be, and often is, driving the market. Factor modeling produces many insights, primarily from its short-term role in driving rates and making decisions. Short-term factor modeling probably is better than models based on intrinsic value, because the

market at that time is being driven by psychology, overreaction, behavioral finance, and the like.

These psychology effects are not fundamentals. Real fundamentals deal with intrinsic value.

Another important consideration: We can't blame corporate chiefs and finance officers for thinking that the market believes earnings are what matter. Most of the calls these executives get from analysts and portfolio managers deal with earnings.

MARKET IS DEALING WITH PRICE CHANGE, NOT PRICE

LEVEL

Now, let's go deeper into our concerns about the fact that a great many investor focus only on price change instead of price level. Today, most

theories are based on price change, not price level. There have been for some time, of course, alternative views, led by well-known and highly respected scholars and practitioners. These include Tom Copeland, Bennett Stewart, Joel Stern, Bart Madden, and a number of other prominent authors of important books. We would ask you to include Rawley Thomas in this group.

Still, most others among the active investors today follow multifactor modeling. They may not be aware of the ability to employ modern comput-erization to conduct a DCF analysis on an automated basis, working with price levels. Or, they are not convinced of its viability. As we will show you, an automated DCF modeling process is far more accurate. We hope our efforts through this book plus our papers, our other books and the books of others, and the success of our portfolio management returns will convince them otherwise.

An important aside: Corporate executives are especially mindful of how critical the economics are, namely, spending real money and realizing a real cash profit, in making new investments. Not only is each capital project very real, but the entire business can be looked at as a capital project. It's all about cash flow in running a business.

Finance managers need a risk factor that can be applied against cash

flows to be generated. In their 1992 work, Eugene Fama and Kenneth French[2] wrote that beta isn't really predictive. We agree and have been at work for years developing empirical evidence that beta and a DCF model don't mix.

Actually, we believe the two ideas should be combined. The investment community needs a unified theory that focuses on price level first and price change second. Today, the majority of professional investors are skipping the price level step and going instead to a reduced form regression model based on statistics. In this way, they are skipping the individual economic drivers to get at a multiple regression result.

Working to understand investment opportunity on the basis of stock price level instead of change, we've done some analysis. As a bonus, our analysis also provides some insight on forecasting. We'll get to that.

One extensive research study of ours showed plenty of opportunity to identify stocks that are being undervalued. The study revealed an area of low-risk, high-return stock opportunities versus the standard deviation approach. It gave us a method for identifying undervalued stocks, namely those with low risk and high return potential.

Standard deviation analysis can function as a negative. Many investors have a problem by focusing solely on price change. Confusion occurs when [2]Eugene F. Fama and Kenneth R. French, "The Cross-Section of Expected Stock Returns," *Journal of Finance*, Vol. XLVII, No. 2, June 1992, pp. 427–465.

looking at price change historically. Assumed is a fixed risk in every business, or a beta. The ability to be predictive isn't even considered. Thus, the market develops great analytics, but find they have little predictability when trying to make it a meaningful test of future performance.

Proof? A stock with a beta of 1.2 has no more predictive value than a stock with a beta of 1.0. That has been shown to be the case in study after study. In reality, beta isn't robust when it comes to predictability. In their 1992 paper, Fama and French wrote that beta isn't predictive. We can readily explain the problem with beta. Depending on the time period and how beta is calculated (various

services have different ways), you can arrive at a beta that is twice another, with none of it empirically tested for predictability. We have seen examples of a stock with betas of 1.4 and 1.8, based on the same price history. There is no discussion of which beta is more accurate. In truth, neither is right, because the future will turn out totally different from the calculations anyway.

As a methodology, standard deviation essentially carries the same type of problem. It also is backward looking.

Price movement occurs with every stock over time. Little real consideration has been given to whether it has any meaning for the future. Very little has been done in determining that meaning.

That logically leads us to the classic problem of forecasting. Virtually all forecasting is inaccurate. Studies show that most companies have inflection points at various times. That's where we put our emphasis and study in working with our cash economic return model. What can be forecast with any degree of reality is the steady state of the business going forward, using a growth rate of some type.

We have chosen a fixed growth rate of 3 percent for companies, relative to their current sustainable growth rate. Why a fixed rate? Trying to keep pace with a changing rate in such a dynamic economic and political environment is likely to end up producing a bad guess at best. Plus, a flexible rate would be changing so often, it would render good modeling impossible.

A 3 percent real rate is consistent with recent GDP growth in the United States.

One way to refine the process is to model the real economy growth rate as a function of investor tax rates, monetary policy, and elements of the Index of Economic Freedom. These refinements would need to deal with tactical asset allocation decisions and more informed political debate on policy issues. To wit: Rising tax rates under the current Obama presidential administration likely would have a devastating effect on the economy, pushing the economic growth rate to below 3 percent and causing valuations to fall. That isn't necessarily a prediction.

BRINGING HISTORY UP TO NOW

Let's take a realistic view of market behavior.

Investors tend to get stuck on certain philosophies and processes. The stock-investing industry has gone from the basic P/E model to earnings momentum and the efficient market theory today. We argue that there are three common thrusts today.

First is to determine value by looking at the company's growth rates, by studying and gaining the best knowledge and insights possible on the value of the company. For believers in this process, it becomes virtually a religion.

We have that religion.

Second is the momentum market. These investors are less concerned about a company's value. Focus on buying a company that is growing its revenue and earnings. Stock price may even grow to the point of being overvalued. These investors can turn into optimists, perhaps at the expense of being realists. Their psychological theory is that the market doesn't know how to appreciate the potential of these companies and it never will be in the price, so keep buying the fastest-growing companies and don't worry. The company's sales always will outgrow the market's projection and perceptions of its capabilities. If it grows fast enough, the company even may be undervalued. This describes the belief system of the momentum players.

These investors look most closely at revenue growth rates of companies, with their chief metrics—alone or in combination—being earnings growth, return on equity, PEG ratios. The idea is to incorporate the growth in the ratio. This all grew out of the effort to strengthen the role of earnings and mainly led to multifactor modeling.

Third are the efficient market theory players. Some academics and investors are almost admitting they and the market really can't determine the value, so why worry about it. Better to purchase index funds. If you can't beat the market, diversify and buy the market. Because the world is imperfect, we need a portfolio of well-diversified selections. A couple of vital assumptions underpin this method: Data are imperfect and judgment is imperfect. We could be wrong and we want to make any loss a small proportion of our total portfolio.

This, of course, runs opposite to the Warren Buffett philosophy: Know the business real well and buy companies you know real well. He studies and studies the managements of the companies he invests in.

He doesn't just buy the stock, he buys the management. He is selective, working with a concentrated portfolio. Try as they might, most investors only can mimic his style; they can't duplicate it. They can't duplicate it because they cannot

get inside the company and don't have the time to devote to obtaining all this additional information.

Efficient market believers have a sizable number of products to choose from today. They can buy and hold portfolios consisting of a large basket of stocks representing all markets. The challenge is to figure out what is the market. The market continues to undergo expansion; it truly is global today.[3]

BACK TO EARNINGS: WHY THEY STILL PREVAIL

Our history lesson continues with some more thoughts about why earnings still prevail. Investors and academics fell in love with earnings early on as the metric of choice in figuring out what a company's stock is worth.

They built the foundation of investing in stocks around earnings and have stayed with it ever since. It is comfortable; it seems to work. The market understands earnings-based methods. Investors and scholars have worked hard over decades to understand and refine the modeling with earnings as the basic metric. They believe it offers a high level of accuracy in valuing a company and its equity. They are reluctant to take on something they have less understanding and comfort with.

Accounting practice supports the reliance on earnings. Accounting practices centered on earnings have been around for a long time. Refinements have been ongoing. Indeed, our current accounting ways have become standard practice. Again, there is a reluctance to move to a new approach.

As we shall see later, our new approach based on intrinsic valuation and cash economic return requires replacing the traditional accounting principle of matching expenses with revenues to produce periodic net income. The replacement intrinsic valuation accounting principle becomes matching gross cash flows against inflation-adjusted gross cash investment to produce periodic real returns on investment that are directly comparable to investors' discount rates.

Meanwhile, stock investing solely based on earnings growth just continues to expand. Also, revenue from trading commissions continues to rise for most brokers. Momentum in stock investing based on earnings just grows and grows. Sell-side analysts have had considerable influence in promoting 3Richard Roll first analyzed the challenge of determining the market portfolio consisting of " *every* [italics added] individual asset" in his classic paper, "A Critique of the Asset Pricing Theory's Tests: Part I: On Past and Potential Testability of the Theory," *Journal of Financial Economics*, 4 (1977) pp. 129–176.

earnings as the base measure of business performance. Analyst reports virtually focus on earnings estimates. Earnings have long been the yardstick in predicting companies' financial results, more important than revenues and cash flow. Portfolio managers' multifactor models tend to favor earnings cast in various possible outcomes as the main driver of annual and quarterly results. These models emphasize analysts' consensus of earnings results, earnings momentum, earnings change, earnings surprise, and so on.

Analysts' earnings predictions even became the basis of corporate guidance a few years ago, starting on an annual basis and then becoming quarterly. Company guidance combined with analyst forecasts of earnings literally can determine stock price movement up or down. It became and continues to be too big a factor in valuing a company.

For corporate managements, the number that has become critical is earnings. Investor communication from companies focuses on earnings.

Management wants to be paid based on earnings performance. It is a serious problem when the company doesn't make the projected/ predicted earnings number.

This means that despite all the financial control under management, you still couldn't meet earnings expectations. There are so many levers management can pull, so much discretion in the accounting rules enabling the company to make the earnings number; this must be a disaster: Don't take your write-off this quarter. Don't recognize your losses. Reduce your inventory. Don't pay your payables first. My co-author has friends who have worked for companies with two drawers

for sales this month and next month. If the company isn't going to make the numbers this month, borrow from the next. If you are going to really miss big, delay some orders to make it a one-time event and build a kitty for later. You can always be uncertain about a sale and when to record it.

I worked for a firm that utilized its president's contingency fund to smooth quarterly earnings. Northern Illinois University's ethics program explicitly mentions the extraordinary pressure of managements to meet market expectations as a moral issue.[4]

Much of the emphasis on earnings has evolved over time. Evolved?

That seems to be the way the market operates, by evolving. Just look at efficient market theory, the capital asset pricing model to account for risk, and continuing and continuing. Much of what forms the foundation of stock investing today remains theory that never has been thoroughly tested against DCF intrinsic valuations. Asset pricing model tests mostly have focused on price change, not price level.

4Northern Illinois University College of Business, *Ethics Handbook: Building Ethical Leaders*, 2006, p. 9.

Academic silos have seriously gotten in the way of advancing the practice, especially in the direction of cash flow modeling. Through recent history, people have gone about their research and writing and investing separately. They tend to build their camps of admirers and followers and mimickers while not talking to people with other, contrasting, and maybe even contradictory, methods and processes. Maybe it's ego, maybe it is a form of competitive determination, maybe it's a strong desire to push their own ideas. We certainly can understand the latter; we're doing that in this book right now. We feel the conviction that our method is a better way to invest because it is based on economics and cash, but not on accounting conventions.

KEY TAKEAWAYS

1. Focus on investable cash flow instead of earnings and intrinsic valuation to estimate price level before estimating price change.

2. We need a new accounting principle based on intrinsic valuation and cash economic return to replace the traditional accounting

principle of matching expenses with revenues to produce periodic net income. The replacement intrinsic valuation accounting principle becomes matching gross cash flows against inflation-adjusted gross cash investment to produce periodic real returns on investment, which are directly comparable to investors' discount rates.

Section

Three

Brief Discussions of

Various Investing

Methods

HOW BEST TO COMBINE INVESTING METHODS

WITH LCRT'S MODELS

Each chapter in Section III offers a brief discussion of the existence of intrinsic valuation, the importance of price level estimation, and various investing methods. We explain why we have decided not to use some methods and how best to incorporate others into the LCRT valuation framework.

Chapter 9:

Do Stocks Have Intrinsic Value?

 Hopefully, this chapter will stimulate you to reexamine your methods and implicit underlying assumptions for investing. For example, Chapter 10

includes:

- Why Use Analysts' Traditional Cash Flow Forecasts. Why Not.

- Why Use Dividends to Value Stocks. Why Not.

- Why Use the Simplest Model, EBITDA. Why Not.

- Why Use Earnings. Why Not.

- Why Use Price Level from Regression Analysis. Why Not.

- Why Use Residual Income or EVA(R). Why Not.

- Why Use Cash Flow ROI, CFROI(R), Cash Economic Margin, or Cash Economic Return. Why Not.

I strongly recommend that the very best way to distinguish these models is to test them. Empirically test your model with the measurement principles of robustness, accuracy, nonbias, and predictive capability, based solely on historical data without analyst intervention. Chapter 14, "Our Automated DCF Model—The Better Model" and Chapter 30, "Comparing Our Model against Three Popular DDMs" explain these measurement principles and their application in great detail.

CHAPTER 9

Do Stocks Have Intrinsic Value?

Dostockshaveintrinsicvalue?Italldependsonyourbeliefsandunderlying assumptions.[1]

If you believe in the traditional academic assumption[2] that prices reflect all the information available in the marketplace, you are assuming implicitly that prices equal the average intrinsic valuation of all market participants.

Price changes precisely equal changes in intrinsic valuations. Believing in perfectly efficient markets, where price equals intrinsic value, prompts you to invest in capitalization-weighted indexes. Don't try to beat the market.

Minimize trading costs, management fees, and price impact costs.

However, we hope and assume that you are reading this book because you are an active investor or want to explore the possibility of active investing. Implicitly, therefore, you do not believe that price reflects intrinsic valuation. Markets overreact. You see it all the time! The dispersions of price around averages are just too wide to suggest instantaneous efficiency every minute, day, week, month, or year.

We agree with you. The empirical data support your desire to be an active investor.

We offer a caveat. Beating the market is not easy. It requires hard work. There are a lot of very smart people out there. And price-impact costs can easily wipe out excess returns when trading volume becomes large enough—as with some mutual funds.

Beating the market requires an information advantage over the people on the other end of the trades. These people include anyone not basing decisions on intrinsic valuations as core fundamental anchors: noise traders, momentum traders, multifactor model investors, high-frequency traders, and so on.

ValuFocus Investing's goal is to provide you that information advantage.

1For a more extensive discussion, please see *The Valuation Handbook, Valuation Techniques from Today's Top Practitioners*, John Wiley & Sons, Inc., Hoboken, New Jersey, pp. 587–589.

2The academics who believe in this assumption tend to be those focusing on asset pricing theory of price change, not those performing research on DCF valuation on price level or behavior finance.

BRIEF DISCUSSIONS OF VARIOUS INVESTING METHODS

Warren Buffett does not invest in stocks; he invests in businesses at the right price. What is the right price? It is the price that provides him a reasonable return on his investment. The investment is simple: It is the price he pays. But return is trickier. The return is based on future earnings that can be reinvested once the capital to maintain existing earnings is accounted for. Warren uses sustainable earnings, based on history. Warren targets a 20

percent return (sustainable earnings − capital expenditures = investment) and wants to be assured that the excess earnings can be invested to get a 20

percent return. He is investing in a good business driving 20 percent returns forever. In essence, this is Warren's intrinsic value. A discounted cash flow (DCF) calculation shows the price Warren should pay. Warren also uses a safety factor (discount on calculated value), because the future cannot be known with certainty.

Warren does not depend on the stock market for his return. He will hold the investment as long as this "good" business is returning 20 percent annually. He wouldn't care if the stock market closed. Should the company stop earning 20 percent on its invested earnings, he will take his earnings in cash (dividends) and find another business to invest in with a 20 percent return. Warren always gets a 20 percent return, one way or the other; his businesses consistently achieve their intrinsic value. Since Warren is one of the richest men in the world, I guess stocks have an intrinsic value.

The second question is: Can intrinsic value be calculated, or better yet, can it be calculated accurately? The answer is yes, and we lay out the process for doing so in this book. That is the thread that weaves through this book.

When you have completed reading the book, you will be able to answer this question on your own.

BASING INVESTMENT DECISION ON INTRINSIC VALUE

First, we need to get you to buy into the reality that companies have an intrinsic value and that it can be estimated; better yet, defined and

calculated.

Some people in the investment-thinking field don't believe that companies have an intrinsic value. We respectfully disagree.

Stock investors view intrinsic value in several ways. Some believe that it exists and some don't. Some simply ignore it, probably choosing instead to buy and sell based on trading activity and price momentum.

We start with the efficient market theory (EMT) school of investing, which by now we have made abundantly clear has a big following among investment professionals. EMT advocates believe in instantaneously efficient markets. Well, that must mean they also believe in some form of intrinsic value, because they are saying that price equals the intrinsic value of the business gathered from all the information available to the market.

It's a tough position for us to buy. The market is saying when price changes, it must mean that the company's intrinsic value also is changing.

Not necessarily, and in today's volatile market, not likely. Indeed, even logic suggests that this assumption gets a little shaky when you look at how small changes in assumptions, as we have seen, can trigger large changes in intrinsic values. Think about how a major downgrade or boost in a company's next quarter's earnings estimates by the sell-side analyst community can trigger a 25 percent drop or rise in its stock price in just an hour. Are intrinsic valuations that sensitive to changes in assumptions?

They are not. Or is the market depending too much on price change and not enough on price level? We certainly think so.

Let's look at the market more realistically. Clearly, it isn't perfectly efficient. Proof is the wide range of investor thinking, reflected in an equally wide range of investing models—investors using intrinsic value models, multifactor models, efficient market models, indexing, and add significantly, traders focused only on price in their buy-sell decisions.

In fact, enough traders piling up on a stock can cause the price to move away from the company's intrinsic value rapidly. We lose count

of the number of frustrated CEOs and long-term investors watching stock prices slide well below intrinsic values at times of market volatility, usually caused by investor fear.

Of course, this kind of market behavior often combines fear and opportunity. Perhaps more of one than the other occurs depending on whether economic, political, and related conditions support optimism or pessimism.

Often it's both. Experts in behavioral finance tend to distinguish this group of investors by calling them momentum traders, noise traders, or technical traders. Clearly, they are not intrinsic value investors.

The very nature of the equity market demands that companies have a value. Investing in stocks and bonds, after all, is a process of making (or losing) money based on valuing the company itself. For any kind of value to be established, there has to be some trading, up and/or down. A value can't be established if there is no trading, or even if there isn't a sufficient amount of trading to give confidence to the level of intrinsic valuation.

While it never will happen, if every investor used the identical intrinsic value model and traded only on the same information, no trading would occur.

All this analysis builds a really good case for showing that the price does not indicate intrinsic value. That says the efficient market theory is not the best approach for picking stocks and managing portfolios. We want to add here that "mark to market" investing strategies are not the best way to go either. Often, they result in valuations that are lower than intrinsic value because the trading activity is driving down the price of the stock. These

companies' intrinsic values are much higher than current trading prices.

Of course, that's okay if you are a patient long-term investor looking for underpriced stocks.

The good news is that all our studies, adding up to empirical evidence, indicate that prices migrate toward intrinsic values. At times, they are lower or higher. Investors overreact or underreact. Traders are doing

too much or too little. That's why our studies show that, when the whole market is priced near its intrinsic value, about half the stocks in our U.S. universe are underpriced or overpriced most times. Guess it makes sense to grow a portfolio consisting essentially of underpriced stocks while quietly selling off those shown to be overpriced.

So what constitutes a concrete definition of intrinsic value? It is what the business is worth based on appraisals of all of its assets from outside experts.

How do investors calculate a company's intrinsic value? Basically, there are two methods. The first is to use historical data and the second is to forecast cash flow while incorporating an ending or terminal value. We have described these ways around Table 12.1. Further, the calculations can be done by hand. Hand calculations are a time-consuming, labor-intensive effort that centers on analyzing each company, one at a time for the current year. Or, it can be automated. Our model is automated. It is an automated or expert system DCF model that incorporates the work of smart analysts and their forecasts.

VALUE ASSETS ON ECONOMIC BASIS

There are two vital planks in our stock investment foundation.

1. A company's intrinsic value, calculated through an economic analysis, is the best basis to determine the anchor around which price fluctuates.

It enables us to figure out if the market presently is under-, over-, or fairly pricing the stock.

2. Cash flow modeling provides the truest and most accurate process for determining a company's intrinsic value. It enables us to focus on the economic fundamentals of the business.

We have shown how accounting-based modeling, mostly centered on earnings performance, is flawed.

We have shown how the market's penchant for valuing stocks based on whether the price is rising or falling, or in other words, on price change momentum, fails to deal with the important economic fundamentals of the company that should determine a fair price.

TABLE 9.1

Net Free Cash Flow

Net Income	$204,104
+ Depreciation	$ 22,772
+ Working Capital Decreases	$ 51,587
− Capital Expenditures	$ (34,809)
= Net Free Cash Flow	243,654

So our focus is on the economics of a business—on its ability to generate cash that is used to pay expenses and continue to grow. What can be more basic! Investors should find it easy to conclude that cash flow is the most accurate way to value a company. That value then gets translated into determining a fair price of its equity and debt.

Discounted cash flow is the foundation of valuing virtually anything—stocks, bonds, gold, your house, you name it. Call them all assets. Intrinsic value is the basis to determine if a particular asset is under-, over-, or fairly priced. It is fundamental economics.

DCF modeling today takes many forms—from quite simplistic to highly sophisticated models aimed at estimating a company's free cash flow. Free cash flow? That's the money left over after all the bills have been paid, employees compensated, marketing programs implemented, tax obligations met, dividends paid and received, to reinvest in new products and plants, acquisitions, and other ways to continue growing the business.

Another term is net free cash flow. It is the discretionary cash created by the company. It is the cash remaining after reinvestment to support future needs for continuing to grow the business and pay for normal operations.

On the books, it consists of a number of key elements and is calculated this way as shown in Table 9.1, in our example from a representative company.

ESTIMATING INTRINSIC VALUE THROUGH A DCF MODEL

DCF modeling is a universal tool; it links analysts, investors, and company managers. Companies estimate cash flows and discount them back to the present. Managers estimate the cash flows against the cost of funding the project to decide whether to go ahead with it. Equity investors work their models to determine the intrinsic value of the company and its equity. Then, they compare that amount to the current market price to determine if the stock is being over-, under-, or fairly valued. That's the way it should work.

Thus, it all starts with the business. Investors form a keen group of judges. They can view the business as a collection of projects in valuing it. We believe that cash flow models aimed at estimating intrinsic value

serve and should serve analysts, investors, and corporate managers equally well. The models help investors judge the performance of the business managers who are being paid to create shareholder value. Ideally, investors should employ the identical cash flow principles and methods that business managers utilize!

Used effectively, DCF models can enable investors to base price on economic fundamentals. They can filter out market noise, which often takes away from being able to make an accurate evaluation of executive performance. Management grades are based on optimizing intrinsic value and not market price. Eventually, the market will recognize and migrate toward that intrinsic value. It usually does.

It's unfortunate that the market has moved seriously away from intrinsic value analysis in favor of statistically based factor modeling. DCF models provide insights not available with statistical methods. DCF models account for price level and not price change. Thus, DCF forms the basis of the price formation process. These models can explain how the market is forming the price. Understanding how the market values stocks is critical to both vital groups—corporate managers and investors.

With DCF modeling's focus on cash, it can help a company grow intrinsic value by providing the information that enables its managers to better understand the economic drivers that are increasing intrinsic value, leading to a higher stock price. Finding and building on the value drivers is a huge benefit of a DCF approach. Factor models and other statistically based methods can't uncover these insights. A good example: A book-to-price ratio may predict a future return, but it doesn't help managements make capital spending decisions.

The focus on cash flow by companies and investors motivates both groups to center their analysis on the important value drivers of the business. It encourages conducting an analysis of the key value drivers and thus leads to a better understanding of the economic value of the business.

KEY TAKEAWAYS

1. Efficient market advocates believe and implicitly assume that price always equals the average intrinsic valuation of all the market participants. Based on the empirical evidence—both others and ours—we respectfully disagree.

2. Again, what matters is cash. Cash paid to purchase assets. Cash flow derived from those assets.

CHAPTER 10

The Pros and Cons of Various

Methods and Models

WHY PRICE LEVEL MATTERS

Why does price level matter? It's simple.

The answer: Without a deep understanding of the intrinsic value of the stock compared against current market price, we cannot know what the likely price change will be. All studies show that all we can project with some degree of certainty is the future migration of market price to intrinsic value. Intrinsic value stems from the current business practices continuing.

To enhance our knowledge, we can project the changes in future performance, working from history and judgment, but this always will contain uncertainty.

We believe, supported by our extensive empirical research, that price does not always equal intrinsic valuation. The market is not perfectly efficient. With an information advantage to quantify intrinsic valuations accurately, you can trade with less informed people to beat the market. We do know that market price will migrate to an accurate intrinsic value. We also know that for most businesses (80 percent), previous operational performance indicates future performance. Being right 80 percent of the time will make you a good investor.

And you don't need to compete against high-frequency traders with their whirring computers, who are trying to squeeze out the last penny of price momentum. In fact, flash crashes provide immense opportunity to profit at the expense of these traders. You just need to know accurate intrinsic valuations, because these traders don't focus on those economic fundamentals. They possess no intrinsic valuation as the anchor to judge their trading strategies.

You become a contrarian.

WHY USE ANALYSTS' TRADITIONAL CASH FLOW FORECASTS. WHY NOT.

Individual and institutional investors as well as the top sell-and buy-side analysts can create an information advantage from having unique insights into the competitive and macro impacts affecting any company.

Linking these forecasting insights is one crucial dimension not incorporated into the automated discounted cash flow framework described in this book. Our framework is based on historical data.

Information gleaned from analyst research can add substantially to the advantage you can build in making stock decisions.

We do offer a caveat, however, in promoting the role of analyst research.

Forecasts of analysts and smart investors cannot realistically extend much beyond one to three years. Crystal balls simply don't reach out

any farther.

Too much can happen. Too much uncertainty exists.

For this reason, security analysts traditionally do not estimate cash flows beyond their designated terminal value period. Please see Table 12.1 for an example to illustrate the extraordinary effect of terminal valuation assumptions. This terminal valuation represents standard practice. The problem is that no one, to our knowledge, bothers to test empirically whether those terminal values provide robust, accurate, and unbiased estimates (see next para-graph for reference) of current stock prices. In contrast, this book presents a meticulous research measurement methodology for assuring that the terminal valuation structures pass extensive empirical testing for validation.

Please see Chapter 14, "Our Automated DCF Model—The Better Model" for a complete discussion of the measurement principles of robustness, accuracy, and nonbias. This chapter describes the positive effect these measurement principles have on future course stock prices. We are talking about the excess shareholder returns you want to achieve with your investment portfolio.

Thus, we prefer that you employ the intrinsic valuation models described in this book for your terminal valuations. Combine the best of both—your macro/competitive insights with empirically validated DCF models.

If you love your own valuation model, please read: Chapter 11: Suppose You Love your Current DCF Model. Empirically test your valuation model to assure that it is robust, accurate, unbiased, and predictive.

WHY USE DIVIDENDS TO VALUE STOCKS. WHY NOT.

Dividends are the obvious choice to value stocks, because they represent the amount of cash actually received by investors. In fact, dividend discount models (DDMs) likely were the first valuation models.

So, why don't we use DDMs?

Three reasons.

1. DDMs are incomplete. They do not include price appreciation or

depreciation—the much larger component of total shareholder return.

2. They fail to include the economic returns on investment within the corporation that drive its ability to protect and grow its dividends.

A company's capacity to pay dividends relies on its ability to achieve returns on the capital entrusted to it that exceed the cost of capital or investor return requirements.

3. Making DDMs robust becomes an impossible challenge. By robust, we mean the ability of a dividend discount model to produce an intrinsic value for every firm for every year in an automated way from historical data without a security analyst forecast.

For example, Equation 10.1 represents a perpetuity Gordon dividend discount model:

Equation 10.1 Gordon Dividend Discount Model

Dividend

COE-Growth

If either dividends are zero or growth exceeds the cost of equity (COE), the Gordon dividend discount model cannot calculate a positive, sensible intrinsic value. It is not robust.

Model builders have solved part of this problem by employing return on equity (ROE) and dividend payout ratios regressing toward the mean to produce a dividend stream. However, these models cannot calculate an intrinsic value when starting with negative earnings or negative equity.

Please see Chapter 30, "Comparing Our Model against Three Popular DDMs" for a more complete description of this empirical research.

WHY USE THE SIMPLEST MODEL, EBITDA. WHY NOT.

People strongly desire simple models. So, when people ask me for the simplest possible model, I recommend 8 X EBITDA.

8 X EBITDA is extremely simple. Just take the firm's earnings before interest, taxes, depreciation, and amortization and multiply it by 8. Divide by the number of shares and you have an intrinsic valuation.

Because EBITDA is positive more frequently than earnings after taxes, it produces more robust intrinsic valuations versus price/earnings

ratios.

But, since negative EBITDAs produce no sensible intrinsic valuations, the

model is not robust for tiny startup firms—the growth engines of future technology.

Eight is the long-term average of EBITDA multiples.

In fact, 8 X EBITDA is so simple, it becomes overly simplistic. It leaves out too many important dimensions, such as the balance sheet and cash flows necessary for reinvesting within the business to grow.

8 X EBITDA fails to build on the core financial principle that firms create intrinsic value by investing in strategies or business units or customers to achieve returns exceeding the cost of capital. EBITDA just does not include the balance sheet investment required to produce the return.

Of course, some investors who employ comparables may say, "Let's use the EBITDA multiple for each industry this year." Their implicit assumption is that firms' EBITDA multiples regress toward the industry average: High EBITDA multiples decline and low EBITDA multiples increase. The theory of regression toward the mean is good as far as it goes. However, again it misses the causality of the firm achieving returns above the cost of capital.

Based on 200 industries, intrinsic valuations over a decade employ 200 X 10 years = 2,000 degrees of freedom. LCRT models employ about 100 degrees of freedom over the decade—just enough to incorporate the most important economic drivers, but not so many as to overspecify the model. Overspecified models that do not rely on the fundamental economic principle of achieving returns above the cost of capital more likely may surprise investors with poor performance on their stock portfolio.

WHY USE EARNINGS. WHY NOT.

Most knowledgeable investors observe how the market reacts to earnings surprises. Prices increase with positive earnings surprises. Prices decrease with negative surprises.

Clearly, earnings surprises are important. Experts who monitor earnings surprises to identify the best security analysts—as examples, Joe Gatto of Starmine and Berry Cox of Abacus Analytics—have observed to me that the market price reaction appears to substantially exceed any reasonable change in intrinsic valuation. I have observed the same price patterns anecdotally.

In the future, I'd like to measure this price effect over the entire universe for at least a decade. The objective would be to quantify the market's overreaction to EPS surprises. This research would help grow our intrinsic valuation framework into a fuller price formation process of market over reaction.

It would decompose price change into the intrinsic valuation effect and the market overreaction to noise effect.

Wouldn't it be nice to know quantitatively how much of the price change following an earnings release is based on a change in intrinsic valuation

and how much relates to the herd mentality of momentum noise traders or the fear of managers rebalancing their portfolio? These noise traders likely spend zero effort attempting to measure discounted cash flow intrinsic valuations. As *c* ash-loving *c* ontrarians, you want to be on the opposite side of the trades against momentum participants or fearful portfolio managers.

In the meantime, pending this price formation research on EPS surprises, we know that earnings are not cash flow, do not incorporate the balance sheet, and therefore fail the causality criteria to analyze a company's returns above the cost of capital. In fact, please permit me to make the following bold statement: Noise and momentum traders confuse corporate managers about what matters to produce long-term shareholder value. The capitalist system needs more cash-loving contrarians to correct this imbalance between stock market participants.

As long-term investors, you want your agent corporate managers to focus strategies to increase intrinsic valuation, not overreact to short-term EPS stock price surprises.

Please see Section IV: "Explaining LCRT's Conceptual Framework in Detail" for more explanation of our philosophical approach based on the economics of the firm.

WHY USE PRICE LEVEL FROM REGRESSION ANALYSIS.

WHY NOT.

Stephen Penman,[1] Feltham-Ohlson[2] (references around "Regression Models of Price Level" in Chapter 11), and the Boston Consulting Group employ regression analysis to establish price levels. With our preference for models that produce price levels, we applaud their efforts over traditional Fama/French regression models on price change.

True, these price change models can produce useful insights on causal variables affecting firms within industries.

Their flaw is that they do not rely on the present value of cash flows derived from company rates of return on company capital above investor return requirements. The causal variable equations are what statisticians

[1]Stephen Penman and Theodore Sougiannis, "A Comparison of Dividend, Cash Flow, and Earnings Approaches to Equity Valuation," *Contemporary Accounting Research*, 15 (Fall), 1998, pp. 343–383.

[2]Please see "Regression Models of Price Level" references in Chapter 11, "Suppose You Love Your Current DCF Model."

call reduced form.[3] They skip the critical step of specifying the cash flow effects of the causal driver variables. If they did include that critical step across all firms for all years, I would applaud their model-building efforts even more. In fact, I believe that strategic consulting firms would benefit the capitalist system sizably by extending their one-off models of industry dynamics to continuous updating of the core strategic competitive drivers for all industries worldwide. Just forecasting industry revenues and market share for each firm within its industry segments worldwide would provide a much sounder basis on which security analysts could base their analysis and forecasts.

Industry models based on several driver variables extend the model-building risk of overspecifying the relationships. We describe this concern in this chapter. Again, assume 200 industries, five driver variables, and a decade of time. The models then use 200 X 5 X 10 = 10,000 degrees of freedom over a decade compared with about 100 for the LCRT models here. The parameters for the models tend to

become unstable through time, making them substantially less useful for predicting likely price change for your portfolio investment. These models are based on statistical correlation, not economic causality.

We recognize the added detail being provided in explaining the esoteric principles of sound model building based on causal relationships. Poring over all this will help you understand sound economic relationships that are likely to produce superior investment portfolio performance.

WHY USE NET FREE CASH FLOW. WHY NOT.

We love cash flow, so why wouldn't we employ traditional net free cash flow models?

First, let's review what we mean by traditional net free cash flow models. Typically, they incorporate a revenue forecast, expense margins, tax rates, and capital turnover assumptions—inventories, receivables, payables—along with capital expenditures. We think this process is just fine for the next one to five years. As we said in this chapter, we would prefer the revenue forecast be based on a worldwide assessment of industry total revenues and market shares produced by one of the top strategy firms, such as the Boston Consulting Group, McKinsey, and so on. We also would appreciate help from these strategy firms on the trends in economic returns

[3] "Reduced form" means that you employ a proxy variable driven from a causal variable, not the original causal variable itself.

based on competitive pressures that we have validated through our research on the fade characteristics, namely, regression toward the mean in both growth rates and economic returns.

Our second issue is with the terminal value. Typically, security analysts pick both the model and its parameters. With those degrees of freedom, the analysts can produce almost any intrinsic valuation they choose. In fact, honestly, many security analysts look at today's price to adjust the terminal valuation assumptions to make the current intrinsic valuation somewhat close to today's price. Thus, the analytical process is not independent: Intrinsic valuation often employs current price to justify the analysts'

terminal valuation assumptions.

Our modeling forces the parameterization from objective (nonana-

lyst) historical data so that 50 percent of the firms are undervalued and 50 percent are overvalued. This analytical process is independent.

We actively discourage security analysts from fudging the terminal value assumptions to assure that the buy/hold/sell recommendation fits their prior beliefs.

Third, some people like to assume that all discounted cash flow models, properly specified, produce identical results.[4] This is correct technically, based on the arithmetic, but, in practice, the structure of the model and its parameterization make all the difference in its ability to explain price levels and predict stock price returns. In my view, built from decades of empirical research, model structure, parameters, and company inputs make a huge difference in the ability of models to properly reflect all firms' intrinsic valuations in a robust, accurate, and unbiased way.

WHY USE RESIDUAL INCOME OR EVA.® WHY NOT.

Residual income or EVA® models, popularized by Stern Stewart, Tom Copeland, Jim Grant, David Trainer, and others, work. Their disciplined approach can produce excess returns to investors.

And they represent returns in excess of costs of capital, so they are definitely consistent with our preference to rely on sound financial principles of corporate finance.

[4]See, for example, Benton Gup and Gary Taylor, "Residual Income and Stock Valuation Techniques: Does It Matter Which One You Use?" *Valuation Handbook*, Chapter 7, pp. 172–181.

Joel Stern, one of the founders of Value Based Management, mentioned the same arithmetic equivalence in e-mail correspondence.

To avoid perpetuities, Bennett Stewart and Joel Stern introduced the innovative T-year factor to model returns on capital in excess of the costs of capital. T is the length of time in years that returns exceed the cost of capital. After T years, the model assumes that the returns drop to the cost of capital, causing no more shareholder value to be created from additional investments.

The devil here is in the details. Since these models rely on net income

over a capital investment, net of accumulated depreciation, they really are not based on the cash flows from the business compared with the cash investment derived from the balance sheet. As investments age, the returns automatically increase—even in a zero-inflation environment. The higher inflation, the more rapid the increase.

Residual income models also tend to rely on capital asset pricing model (CAPM) cost of capital. As we discuss in Chapter 28, "Incorporating Risk into Our Model," we prefer costs of capital derived from our DCF model, not CAPM beta-adjusted ones based on price change.

LCRT prefers exponential fades of returns in excess of the cost of capital, instead of the T time factor.

Lovers of residual income models will benefit from Chapter 11, "Suppose You Love Your Current DCF Model," which provides some of the best references available on these models. We also urge you to empirically measure your model objectively against the core empirical measurement principles of:

1. Robustness

2. Accuracy

3. NonBias

4. Predictive Capability

Please see Chapter 14, "Our Automated DCF Model—The Better Model" and Chapter 30, "Comparing Our Model against Three Popular DDMs," covering these core measurement principles, on the details of how best to produce a good model.

WHY USE CASH FLOW ROI, CFROI,® ECONOMIC CASH

MARGIN, OR CASH ECONOMIC RETURN. WHY NOT.

This is a most difficult evaluation for me to write, because I have such immense respect for all my associates who brought cash flow ROI, CFROI,®

economic cash margin, and so on to practical use.

They all use economic returns based on cash flows generated from operations and the cash investment in assets from the balance sheet.

They

all adjust those returns to cover inflation. They all fade those returns, along with growth rates, to produce the cash flows to be able to discount. They all employ market-built discount rates derived from their cash flow models.

Obviously, I believe these represent approaches that are superior to the other approaches summarized in the past few sections.

LCRT has extended the state-of-empirical-research practice beyond prior efforts in three major ways.

1. Introducing a set of four measurement methodologies to identify the

"goodness" of the models—robustness, accuracy, nonbias, and predictive capability.

2. Employing these measurement methodologies to dramatically refine the models by:

■ Placing all the traditional risk into certainty-equivalent cash flows for small startup option pricing functions and financial leverage risk.

■ Therefore, enabling a single uniform discount rate to calculate present values each year for all firms.

3. Displaying lower fat-tailed risk to produce higher return by bridging Benoit Mandelbrot's path-breaking research into stable Paretian distributions with our automated DCF approach.

We explain all these extensions in detail in the next few chapters.

Our ever-so-brief summary here simply alerts you to what is coming. It is important to us to give you choices in the amount of information and detail that you wish to gather.

CHAPTER 11

Suppose You Love Your Current

DCF Model

Suppose you really love your current discounted cash flow model.

You learned it in graduate school.

Or on your job.

You've spent years learning its idiosyncrasies. You don't want to give up those insights.

You are naturally suspicious of any model that claims to be better than yours.

Yet, you want to remain open to new ideas. And you always wondered about all these models.

We wrote this chapter just for you.

When we are honest with ourselves, we confess that we all "build on the shoulders of giants." We take a little idea here. We take a little idea there. Eventually, we combine the ideas into a consistent whole. We connect the dots.

In this chapter we describe briefly the most recognized discounted cash flow models and provide you many of the best references known to us on them.

So, you can decide which ones are best to use for valuation and stock selection.

We do make one recommendation. At the Boston Consulting Group, we were fond of saying, "Facts are our friends." In this vein, ponder applying the core measurement principles of robustness, accuracy, nonbias, and predictive capability to your favorite model. Across the entire universe.

For a decade or more.

Chapter 14, "Our Automate DCF Model—The Better Model" and Chapter 30, "Comparing Our Model against Three Popular DDMs" cover these core measurement principles on the details of how to produce a good model.

If you think that there are better measurement principles, employ them.

If you don't have the time or inclination to do this research, ask your investment advisor to perform it. If your investment portfolio is large enough, 81

pay someone to find the truth about your intrinsic valuation investment strategy.

By the way, when you conduct or sponsor the research, make sure the work separates historical performance from forecasts. This separation is extraordinarily important to enable you to know how accurate and predictive the results become from *just historical* data and how much analysts' forecasts add to the investment process.

Having strongly recommended comparative empirical validation, we also fully recognize the following:

■ A disciplined discounted cash flow approach really works.

■ A majority of the approaches documented here do produce superior portfolio performance.

We offer the following four categories of discounted cash flow models:
1. Dividend discount models (affectionately called "DDM").

2. EVA® or residual income models.

3. CFROI® or cash economic return models.

4. Regression models of price level.

Since so many of these references come from the *Valuation Handbook*, we offer its full citation here just once:

The Valuation Handbook: Valuation Techniques from Today's Top Practitioners, by Rawley Thomas and Benton Gup, Wiley, 2010.

DIVIDEND DISCOUNT MODELS

Richard Bernstein, Lisa Kirschner, and Kevin Lui, "Quantitative Primer: A Guide to Concepts, Models, and Techniques," Merrill Lynch, 26

September 2002, Dividend Discount Model, pp. 32–33.

Myron Gordon, *The Investment, Financing, and Valuation of the Corporation*, Irwin, 1962.

Michael Rozeff, “The Three-Phase Dividend Discount Model and the ROPE Model,” *Journal of Portfolio Management* (Winter), 1990, pp. 36–42.

Stephen Penman and Theodore Sougiannis, “A Comparison of Dividend, Cash Flow, and Earnings Approaches to Equity Valuation,” *Contemporary Accounting Research*, 15 (Fall), 1998, pp. 343–383.

EVA® OR RESIDUAL INCOME MODELS

Gary C. Biddle, Robert M. Bowen, and James S. Wallace, “Does EVA®

Beat Earnings? Evidence on Associations with Stock Returns and Firm Values,” *Journal of Accounting and Economics*, 1997.

Tom Copeland, *Valuation Handbook*, Chapter 4, “Comparing Valuation Models,” pp. 67–107.

Tom Copeland and Aaron Dolgoff, *EBM: Outperform with Expectations-Based Management: A State-of-the-Art Approach to Creating and Enhancing Shareholder Value*, Wiley, 2005.

Tom Copeland, Tim Koller, and Jack Murrin, *Valuation: Measuring and Managing the Value of Companies*, 3rd ed. (we honor the original author of this book, Tom Copeland, by citing the last edition that he participated in), Wiley, 1990, 1994, 2000.

Pat Dorsey, *Valuation Handbook*, “Morningstar’s Approach to Equity Analysis and Security Valuation,” pp. 305–333.

James L. Grant, *Valuation Handbook*, Chapter 9, “The Economic Profit Approach to Securities Valuation,” pp. 226–254.

James L. Grant and James A. Abate, *Focus on Value: A Corporate and Investor Guide to Wealth Creation*, Wiley, 2001.

James L. Grant, *Foundations of Economic Value Added*, Wiley, 2003.

Benton E. Gup and Gary K. Taylor, *Valuation Handbook*, Chapter 7,

“Residual Income and Stock Valuation Techniques: Does It Matter Which One You Use?” pp. 172–181.

Roy E. Johnson, *Valuation Handbook*, Chapter 6, “The Essence of Value-Based Finance,” pp. 135–171.

Roy E. Johnson, *Shareholder Value: A Business Experience*, Butterworth Heinemann, 2001. The book describes value-based management in an entertaining, effective story format.

G. Bennett Stewart, III, *The Quest for Value: A Guide for Senior Managers*, Harper Business, 1991. Joel Stern and Bennett Stewart really placed value-based management on the map with their *Fortune* mag-azine and other articles as a recognized discipline. See also Bennett Stewart's Portfolio Management Service, http://evadimensions.com.

David Trainer, *Valuation Handbook*, Chapter 7, "Modern Tools for Valuation: Providing the Investment Community for Better Tools for Investment Decisions," pp. 182–225.

CFROI® OR CASH ECONOMIC RETURN MODELS

Robert J. Atra and Rawley Thomas, *Valuation Handbook*, Chapter 5,

"Developing an Automated Discounted Cash Flow Model,"

pp. 108–134.

Dennis N. Aust, *Valuation Handbook*, Chapter 10, "Valuation for Managers: Closing the Gap between Theory and Practice,"

pp. 255–272. Aust works closely with Ricardo Bekin, of Ativo Resarch. Bekin succeeded Chuck Callard, who founded Callard Madden & Associates, the predecessor of HOLT Planning, HOLT Value, BCG/HOLT, Applied Finance Group, and LifeCycle Returns. See http://www.ativoresearch.com.

Bartley J. Madden, *CFROI Valuation: A Total System Approach to Valuing the Firm*, Butterworth-Heinemann, 1999.

Bartley J. Madden, *Maximizing Shareholder Value and the Greater Good*, Learning What Works, Naperville, IL, 2005.

Bartley J. Madden, *Wealth Creation: A Systems Mindset for Building and Investing in Businesses for the Long Term*, Wiley, 2010.

Rawley Thomas and Robert J. Atra, *Valuation Handbook*, Chapter 10,

"The LifeCycle Returns Valuation System," pp. 273–304.

Rafe Resendes and Daniel Obrycki, "Somewhat Cheap: Applied Finance aims neither for hot growth stocks nor dirt-cheap value ones. Its sweet spot is in between," by Daniel Fisher, *Forbes*, September 29, 2008, pp. 48–50. See http://www.economicmargin.com.

REGRESSION MODELS OF PRICE LEVEL

Jeffrey L. Callen and Dan Segal, "An Empirical Test of Feltham-Ohlson (1995) Model," Working Paper, University of Toronto, 2002.

Jing Liu and James A. Ohlson, "The Feltham-Ohlson (1995) Model: Empirical Implications," *Journal of Accounting, Auditing and Finance*, 2000, V15 (3, Summer), pp. 321–331.

Kin Lo and Thomas Lys, "The Ohlson Model: Contribution to Valuation Theory, Limitations and Empirical Applications," *Journal of Accounting, Auditing, and Finance*, 2000.

Seung-Il Yoo, Sally Webber, and Rawley Thomas, "Accuracy of Feltham-Ohlson and Residual Income Models," unpublished—

available from Rawley Thomas.

MULTIFACTOR MODELS

(Even though they do not primarily rely on DCF, we offer the classic works here.)

Richard C. Grinold and Ronald N. Kahn, *Active Portfolio Management: A Quantitative Approach for Producing Superior Returns and Controlling Risk*, 2nd ed., Irwin McGraw-Hill, 1999.

Robert Haugen, "Inefficient Market and the Potential Contribution of Behavioral Finance: Case Closed," *CFA Institute*, June 2010.

Vito J. Racanelli, "The Schwab Advantage," *Barron's*, November 27, 2006. This serves as an excellent description of the Schwab equity ratings model.

Richard Tortoriello, *Quantitative Strategies for Achieving Alpha*, McGraw-Hill, 2009.

Section

Four

Explaining LCRT's

Conceptual Framework

in Detail

Section IV covers a series of chapters to explain LCRT's conceptual framework in more detail.

Chapter 12: Our Approach

Chapter 13: Focusing on Price Formation

Chapter 14: Our Automated DCF Model—The Better Model Chapter 15: Getting to Know Our LCRT Model

Chapter 16: Digging Deeper into the LCRT Model Chapter 17: Putting Our Valuation Proposition into Perspective **Chapter 12: Our Approach**

1. Focus on cash flow, not earnings.

2. Terminal values are extraordinarily sensitive to input assumptions.

Empirically test their structure with historical data to assure that they are unbiased and accurate.

3. The foundation is intrinsic valuation derived from automated discounted cash flow to estimate where price is likely to head in a price formation process.

4. Price change momentum fails to analyze the fundamentals.

Chapter 13: Focusing on Price Formation

1. It's all about money. Businesses need cash to compensate the owners, managers, employees, and consultants; pay for supplies, equipment, facilities, and support; meet tax obligations; invest in research, new products, production, marketing; and hire more people to grow.

2. Our models are designed to select stocks based on fundamentals, not market behavior, mainly overreaction focused on earnings. There always will be room for continuing improvement. Valuing a company never will be a perfect process.

3. Cash-loving true contrarians are willing to bet against the crowd by utilizing cash instead of earnings and return on investment models instead of multifactor models.

4. Rates of return form the most fundamental basis: portfolio rates of return for investors; and employing identical principles, rates of return on operating assets within corporations.

Chapter 14: Our Automated DCF Model—The Better Model 1. Our automated DCF model enables investors to activate the comprehensive analysis of all 7,000 companies in our database at will, rather than having to analyze one company manually at a time.

2. Our model covers all industries and companies within them, enabling investors to evaluate a large universe of stocks in managing their portfolios.

3. Our model achieves economics of scale in analysis, making investors cost-wise.

4. Our model offers the flexibility to add analyst and the investor's own input, capitalizing on an information advantage or early awareness of a major upcoming inflection point.

5. Our decade of research has yielded four primary principles to evaluate the performance of models: robustness, accuracy, nonbias, and predictability.

Chapter 15: Getting to Know Our LCRT Model

1. Four features, all based on accuracy between price and intrinsic

values across the universe , distinguish our economically based discounted cash flow modeling process. Here is the LCRT framework.

■ It focuses on the economics of a business.

■ It develops greater accuracy in estimating a company's intrinsic value, built on cash.

■ It develops better ways to measure regression toward the mean or fade of returns and growth. Our work on fade enables investors to predict a company's level of performance in the future, estimate a timetable of how that performance will play out, and use that intelligence in making buy, hold, and sell decisions.

■ It places risk effects, like financial leverage, into our specification of the cash flows instead of into the discount rate.

2. Together, these features of our model give investors confidence that they can manage portfolios containing stocks that are truly undervalued and likely to rise in price as the stock market recognizes the opportunity, and sell overvalued stocks early to lock in any price gains.

Chapter 16: Digging Deeper into the LCRT Model 1. LCRT models fade both the cash economic return exponentially to a steady-state CER and the sustainable growth rate to the country GDP

real growth rate. These fade functions effectively provide a baseline to enable intrinsic valuation calculations with no analyst interventions.

2. We fade small startup firms with negative CERs toward returns higher than large firm steady-state CERs, using option pricing functions.

Investors purchase these startups as options, because they expect dramatically high future CERs.

3. Unlike traditional approaches to debt leverage, which increase the discount rate, LCRT applies deadweight costs of financial distress to the intrinsic valuations before leverage adjustments. This certainty equivalent of cash flows approach avoids the circular reasoning problem of having equity price in both the discount rate and the valuation.

4. LCRT sets the investor's real discount rate each year in a way that causes 50 percent of the firms in the universe to be undervalued and 50

percent to be overvalued. We can do this approach because all risk is modeled in the certainty-equivalent cash flows.

5. We calculate model accuracy with absolute tracking errors between price and intrinsic value. Signed tracking errors rely on geometric means between price and intrinsic valuation. More accurate and more unbiased models better predict future price movements with lower risk.

6. Ranges of bounded rationality, similar to Bollinger bands, improve the predictive investment process by modeling price dispersions around intrinsic valuation as the anchors. Unlike Bollinger bands, which rely on standard errors of prices, LCRT's ranges of bounded rationality are based on the economic fundamentals of size, cash economic return, and trading volume.

7. Refinements can make the models even better.

■ Begin with a macro model of under/overvaluation.

■ Use data back to the 1950s to incorporate all regime changes, inflation, investor tax rate changes, economic growth rate, and other drivers to produce macro models.

■ Incorporate an expanded XBRL chart of accounts.

■ Extend backtesting to longer than five years.

■ Extend from annual to quarterly data and more timely frequency.

■ Be totally global.

■ Assure that the best analysts are participating in the process.

■ Incorporate new driver variables into the models.

Chapter 17: Putting Our Valuation Proposition into Perspective summarizes what we have learned so far.

CHAPTER 12

Our Approach

Agood place to start in analyzing the fundamental differences in our approach is to compare earnings and cash-based models.

Is the stock market oriented toward earnings or cash flow? That's a question that's been somewhat of a puzzle for investors and company executives. The simple answer is both. The market is complex and investors use numerous methods in their efforts to grow returns above their investments and hopefully outperform the averages of others collectively.

There are many investors using an economic approach focusing more on cash flow, but there is a bigger legion of investors using an approach focusing more on earnings that are derived mainly from accounting practices.

Completing the stock-investing universe, there also are investors with models that combine cash flow and earnings metrics. These investors also weight their impact on portfolio decisions variously. And, of course, there are the many investors who apply multifactor models and the big crowds that follow passive quantitative, indexing, and hedging strategies.

Investors generally agree that the most fundamental valuation model is discounted cash flow. Variations, add-ons, and refinements include dividend discount, economic profit, economic value added, and cash flow return on investment.

We've covered the earnings-based and multifactor models, and so we'll focus now on the economic, cash-based models as a way of moving into our particular process.

DCF says that the value of an investment is its future cash flows discounted back to the present. Cash flows are estimated and discounted to the present at an appropriate rate of return. The present value of any stream of cash flows relates positively to the size of the expected cash flows and negatively to their required rate of return. A broad measure, DCF is used to value a wide range of assets—companies, their stocks and bonds, real estate, *etc.* Its three major components are:

1. The cash flows from a given asset.

2. The time period over which those cash flows are expected to be generated.

3. A discount rate or risk factor adjustment to account for the level of certainty/uncertainty in receiving those future cash flows.

Investors like the DCF model because it focuses on the economic returns of the company's operating businesses. It works right through the financial statements into the valuation model. Increased revenues, reduction in operating costs, sales from new products are turned into cash and increase the value of the equity.

Investors typically calculate free cash flows. Free cash flows consist of the money available to invest in growing the business, paying/ increasing dividends, making acquisitions, reducing debt, or repurchasing shares after all expenses are met.

Dividend discount models (DDMs) are a specific cut of the DCF model.

Dividend discount models enable investors to estimate cash flows in the form of dividends that accrue to shareholders, discounted at their required rate of return. The discounted dividend stream should be equal to the stock's market price.

A cut on the DDM, in turn, is the constant growth model, assuming that dividends grow at a constant rate. However, investors seldom assume that dividends will grow at a constant rate forever.

A number of cash flow variations have been developed by academics and investors. These include EBITDA (earnings before interest, taxes, depreciation, and amortization), EVA® (economic value added), EP (economic profit), and CFROI® (cash flow return on investment).

Cash flow models are viewed as offering the best insight into a company's intrinsic value because the analysis focuses on economic performance. Intrinsic value, in general, is seen as the company's full value as a business—the total value of its assets, translated into the ability to generate cash flows long term. Thus, intrinsic value also is linked to terminal value.

DCF models are used to calculate both intrinsic and terminal value. Terminal value calculations extend the cash flows into perpetuity. Textbooks typically stretch the time horizon out 20 years with a perpetuity terminal value at the end. Investors tend to be more practical, using a time horizon of perhaps three to five years.

The key notion is to calculate a growth rate over the designated time period. Will cash flows grow at 5 percent a year, 10 percent, or 15 percent?

Investors recognize that a company growing at a higher rate is worth more.

Two variations are the enterprise value and economic profit models.

The former became quite popular while the latter gained ground through the efforts of value-based management consultants.

The enterprise DCF model values a company's equity on the basis of the value of its operations, minus the value of debt and preferred stock. The enterprise value is the cash flows from operations, discounted to reflect the

level of risk of those cash flows (discount rate). Investors increasingly are using a financial ratio model, namely, price to enterprise value, as their chief model or as a key input in their factor model.

Cost of capital comes into play in the economic profit model. Economic profit focuses on whether a company is earning its cost of capital, or better yet, returns better than its cost of capital. Essentially, it is the after-tax operating profits, less a charge for the capital. This gets stated a number of ways. Economic profit is the spread between the return on invested capital and the cost of capital times the amount of invested capital. Or, it helps determine the amount of capital required to generate revenue.

Enterprise DCF, EP, EVA, and CFROI models are growing in use by corporate managements to gain a better understanding of the value of their business units as well as the entire company.

For investors putting faith in DCF approaches, the ability to define a company's intrinsic value becomes the basis to determine if the stock

currently is under-, over-, or fairly priced (valued) by the market. Investors, of course, are seeking to identify undervalued opportunities.

DIFFERENCES BETWEEN INTRINSIC VALUE AND MARKET VALUE APPROACHES

A fundamental difference exists between the intrinsic value and market value approaches. Market-based models focus on market and investor behavior.

Generally, they fall into the comparables method, because investors compare a company-generated metric, such as earnings, to a market-generated metric, namely, the stock price.

In the comparables arena come the earnings-centric models. Other popular comparables are price to sales, price to cash flow, price to EBITBA, price to enterprise value, and price to earnings growth (PEG) ratios.

These comparables constitute financial ratio approaches. The favorite is price to earnings. The folks at DeMarche & Associates stated it this way: Believers in relative value models "reject the idea that a stock's theoretical price can be computed; rather, they maintain that individual stocks have value only relative to other stocks and that this relative value is a function of the relationship between certain key company characteristics that are representative of the relative risk-reward relationship of a given stock."

Many investors in both the "Growth" and "Value" style camps prefer price to sales, believing sales provide a more consistent basis than earnings.

Value investors like price to book (equity) value, because it provides a view of the net value of a company's cash-generating assets and because it is linked to the balance sheet. It relates stock value to net worth per share.

Most of these models are based on past performance; they even include historical growth rates. Of course, there are investing approaches that forecast cash flows, sales, and earnings growth.

True believers in cash flow and intrinsic value label comparables methods as second-order metrics or shortcut heuristics to get from A to B. But in reality, most low price/earnings stocks become high P/E stocks because they generated excess cash flow and grew their returns on invested capital.

Still, the majority of investors adhere to a practical bent, following market behavior, using a comparables approach.

EXPLAINING VALUE

Better for you is to focus your investing effort on value, driven economically by cash flows. The starting point: Value is created by two unknown drivers—the discount rate and terminal value. Any theory behind a cash flow model is tied to these two numbers. With the discount rate, investors use what they believe is appropriate. As longer-term investors basing their beliefs on cash economic growth, our model uses 3 percent as the fade-to-growth rate, which is consistent with what GDP real growth has been for a long time. The current economic environment may suggest that a lower growth rate deserves consideration. Hopefully, not.

Terminal value should be based on your view of the perpetuity of the business, namely, your best estimate of the company's ability to maintain and grow cash flows at certain levels over a determined period of years.

In our model, we also apply a fade rate. We will describe how our model predicts a company's fade rate later in this book.

The reality of these two numbers produces the result.

That's the theory. Interestingly, investors and academics always have been reluctant to describe how those two numbers should be derived. At this point, these scholars seem to hit a wall. This becomes obvious when you think about what happens when you change the discount by just a small amount with a resulting doubling or tripling of the value. Since about 90 percent of the value is in the perpetuity, just change the assumptions a small amount to see what happens. Table 12.1 illustrates the arithmetic.

Table 12.1 compares Example A and Example B with differing initial cash flow growth rates, costs of capital, and perpetuity growth rates. Please note our two important conclusions.

1. The terminal valuation and intrinsic valuation are 93.2 percent and

97.6

percent, respectfully. The terminal valuations overwhelm the present value of the cash flows for three years.

TABLE 12.1

Terminal Valuation Effect on Intrinsic Valuation Assumptions - Inflation

Example

Example

Example

Adjusted

A

B

B/A

Initial Cash Flow or

$1,000

$1,000

1.00

Dividend

Growth Rate in Cash Flow

10.00%

11.00%

1.10

or Dividend

Cost of Capital or Cost of

6.00%

5.00%

0.83

Equity (COC)

Perpetuity Growth Rate (g)

3.00%

4.00%

1.33

Year

1

2

3

Example A

Cash Flow or Dividend

$1,000

$1,100

$

1,210

Present Value Factor

0.9433962

0.8899964

0.8396193

Present Value of Cash Flow

$ 943

$ 979

$

1,016

Cumulative Sum of Present

$ 943

$1,922

$

2,938

Value of Cash Flows

Final Cash Flow

$

1,210

Capitalization Factor

33.333333

(1/(COC − g))

Terminal Valuation

$ 40,333

Intrinsic Value = Present

$ 43,272

Value of Cash Flows +

Terminal Valuation

Terminal Valuation/Intrinsic Valuation

93.21%

Example B

Cash Flow or Dividend

$1,000

$1,110

$

1,232

1.0183

Present Value Factor

0.952381

0.9070295

0.8638376

1.0288

Present Value of Cash Flow

$ 952

$1,007

$

1,064

1.0476

Cumulative Sum of Present

$ 952

$1,959

$

3,024

1.0290

Value of Cash Flows

Final Cash Flow

$

1,232

1.0183

Capitalization Factor

100

3.0000

(1/(COC − g))

Terminal Valuation

$123,210

3.0548

Intrinsic Value = Present

$126,234

2.9172

Value of Cash Flows +

Terminal Valuation

Terminal Valuation/Intrinsic Valuation

97.60% 1.0472

2. Relatively small changes in both growth rates and the cost of capital raise the intrinsic valuations by a factor of 2.92—almost 3.00.

We retain immense respect for star security analysts who forecast inflections in operating performance from strategic competitive conditions over the next one to three years. Those broad skills

represent huge value being added to the investment process.

We add some more important thinking.

■ Since the final intrinsic valuation results are so sensitive to the input assumptions, the terminal valuation structures employed by security analysts, portfolio managers, and investors should be exhaustively tested with historical empirical data to validate their robustness, accuracy, nonbias, and predictive capability.[1] We'll discuss these thoughts in much greater detail later.

■ The combination[2] of star analysts, individual investors with deep insight into the companies they follow, and empirically validated terminal valuations can become a dynamite combination for superior portfolio performance—lower risk and higher return.[3]

This tells us that people historically have come up with techniques that seem to be good enough, but not necessarily the best. They do a decent job and many professional investors and financial academics have made a good living, and thus they prefer to leave well enough alone. They are not optimizing, they are "satisficing." [4]

1For an extensive discussion of the core measures of robustness, nonbias, accuracy, and predictive capability in the research process, please see "Developing an Automated Discounted Cash Flow Model," by Robert J. Atra and Rawley Thomas in *The Valuation Handbook: Valuation Techniques by Today's Top Practitioners*, Wiley, Chapter 5, pp. 108–134.

2Please see "Common Themes and Differences," by Rawley Thomas in *The Valuation Handbook: Valuation Techniques by Today's Top Practitioners*, Wiley, Chapter 14, especially "Does Intrinsic Value Have Any Meaning?" on pp. 587–589.

3Please see "Lower Risk and Higher Returns: Linking Stable Paretian Distributions and Discounted Cash Flow," by Rawley Thomas, Dandan Yang, and Robert J. Atra in *The Valuation Handbook: Valuation Techniques by Today's Top Practitioners*, Wiley, Chapter 9, pp. 559–582.

4Wikipedia: Satisficing is a *decision-making* strategy that attempts to meet criteria for adequacy, rather than to identify an optimal solution. A satisficing strategy may often be (near) optimal if the costs of the decision-making process itself, such as the cost of obtaining complete information, are considered in the outcome calculus.

The word *satisfice* was coined by Herbert Simon. He pointed out that

human beings lack the cognitive resources to maximize: We usually do not know the (*Continued*)

We're not satisfied. We want ways to optimize the terminal values employed in intrinsic valuations across the entire universe of stocks by uniquely automating the cash flow estimation process from historical data.5

That's why we have spent over three decades working on a better way, making numerous refinements along the way. We believe you can gain extra benefit from giving our process and methodology a long study.

ATTACKING THE OLD WAYS

Professional investors fall in love with their ways and their models. In most cases, they have been taught their methods and models by investors and scholars who were their mentors and likely achieved a sizable amount of respect, success, and recognition. However, much of what has been taught, what is pervasive and generally accepted, is, in fact, more myth than reality.

It is backed by very little empirical evidence in using DCF intrinsic valuation research. That empirical evidence focuses almost entirely on asset pricing models of price change, not price level.

Success is relative, as becomes quite evident in times when the economy and the market are down and nearly every investor is hurting, at least to some degree. Efficient market theory (EMT) has taught us that long-term investing in the stock market is the best way to make money on your money.

It is loaded with assumptions that simply aren't real. EMT advocates want investors to ignore the realities of tax impact, costs of buying and selling shares, fluctuating interest rates, and others.

Because a theory has some success doesn't mean it's the best way to go. EMT benefits from the sound principle of diversification. Absolutely, it makes sense to have a well-diversified stock selection. However, the more stocks in your portfolio, the more costly it is. If you are content to buy the market, that is, follow the EMT into indexing so your portfolio matches market returns, there still is a good

possibility of achieving an 11 percent (*Note Continued*)

relevant probabilities of outcomes, we can rarely evaluate all outcomes with sufficient precision, and our memories are weak and unreliable. A more realistic approach to rationality takes into account these limitations. This is called *bounded rationality*.

5For an extensive discussion of automation potential of privately held and illiquid firms where courts increasingly require empirical validation, please see "Portfolio Valuation: Challenges and Opportunities Using Automation," by Randall Schostag in *The Valuation Handbook: Valuation Techniques by Today's Top Practitioners*, Wiley, Chapter 15, pp. 388–416.

See also Rawley Thomas and Randall Schostag, "Discounted Cash Flow Method: Using New Modeling to Test Reasonableness," *Valuation Strategies*, September/October 2006, pp. 24–41.

return over a decade. No other form of investment can beat that; maybe real estate for a while, but look at what has happened to it early in this century.

But if each year, you can find 20 stocks with an average 60 percent return, why don't you just pick them? The simple reason is that most all of those returns have been competed away. Can you really give up a 49 percent return and still see yourself as an effective stock investor? The classic attitude is to be pleased with an 11 percent return. Warren Buffett has proved that the market is not efficient and it is quite possible to garner returns better than 11 percent.

Behavioral finance specialists, such as Robert Schiller6 in the early 1980s, have shown the benefits of taking advantage of an inefficient market.7 Just look at the dispersion of price around a reasonable estimate. Analysts'

estimates can vary widely. Investors' models show considerable ranges; our own models do. We call it Rawley ranges of bounded rationality, described around Figure 16.5. If the market were perfectly and instantly efficient, or was becoming more efficient regarding a particular stock at a particular time, the dispersion would contract. Dispersion being wide and not narrowing proves that the market is not efficient. In fact, the issue that our work has moved toward

resolving is just how much inefficiency there is in that company's stock price right now.

That moves us to the even bigger question: Is the market sufficiently inefficient for an investor to consistently attain superior returns, after adjusting for risk, transaction costs, management fees, and even price impact?

We say, yes.

MODELING ON ECONOMIC FUNDAMENTALS,

NOT ACCOUNTING MUMBO-JUMBO

Okay, hopefully, we have convinced you to take a long look at our approach.

By this time, we're sure you at least will agree that we have been working very hard using words to be persuasive, maybe even too hard. You probably are saying let's get on with it and show us your model.

Patience please. We need to do a little more to set the stage. We think you will find this thinking to be of value.

6Robert J. Schiller, "Do Stock Prices Move Too Much to Be Justified by Subsequent Changes in Dividends," *American Economic Review*, January 1981, pp. 421–436.

7For a particularly good recent book on inefficient markets, please see Justin Fox, *The Myth of the Rational Market: A History of Risk, Reward, and Delusion on Wall Street,* Harper Paperbacks, 2011.

What we are describing is a *price formation process*. We strongly believe that the way investors presently operate in the market is the wrong way.

We've made that very clear, haven't we? It focuses on price change, or price momentum, not on price level. We say your model (our model, take our model, please) should use the current price level as the basis to determine whether the stock is being under-, over-, or fairly valued by the market based on a sound determination of the company's

economically driven intrinsic value.

The propensity of investors today is to build a model, compare the returns to the market's results, and when not satisfied change parameters within the model in seeking improvements. This all starts with the premise that accounting practice is saying this is how to value the business, but now we need to make changes in the model to overcome some accounting inaccuracies or to deal with a reality that historical performance isn't working right now to predict future performance. Essentially, investors are at work in an organized fashion to find a better number.

That's simply not a very sound way to go about building the best understanding of a company's ability to perform and grow based on a solid analysis of its fundamentals. The basic truth: Price change momentum fails to analyze the fundamentals.

Most models are based on accounting data. That's just a starting point with our process. We have developed unique ways to improve on that data.

But first please understand that models forecasting earnings are not based on accounting data that have gone through any auditing process. Factor models are built mostly on accounting data, plus as an investor you can add anything you want as factors. The key point: Price momentum is not based on accounting principles and practices.

Even DCF models have glaring weaknesses. Standard practice has been to plug in a discount rate and terminal value in an effort to match price, maybe even correlate the numbers with history. But there is no causation to prove that the plug-ins mean anything. There is no rational reason for the chosen terminal value time period, or as we call it, fade level. Thus, there is no basis for the model to be more accurate than others.

The DCF approach has cried out for years for improvements. It has been easy for academics and investors to reject DCF alone as the answer because, yes, it isn't enough. So instead it has become one factor in a multifactor model, maybe given more weight than others, maybe less.

The logical conclusion: The modeling process is never perfect. There is this basic problem of trying to get everything in the right place. This basic process is:

- To develop a model.

■ Empirically test it historically.

■ Backtest specific portfolios using the model to get at the results (returns versus the market or other chosen measurement comparisons).

■ Then study the exceptions to make improvements.

We certainly have done and continue to do that as well.

But investors don't need a perfect model. The key is to learn how to use your favorite model that generates the most accuracy in covering the stocks (companies) you want to investigate for investing in. Don't invest in a company when the model isn't valuing it accurately. There are plenty of companies to choose from.

It is valuable to know what a model can and can't do. Studying Exxon and its ship, the *Valdez*, back in the 1990s, offers a good example. Could the market have figured out what was going on at Exxon while it was happening so it could price the stock accordingly? To do so, analysts and investors would have needed to go well beyond the output of the models and the company's disclosure in achieving a closer and more critical analysis of the real value. Even that probably would have been insufficient since not all information was being properly revealed. Dissecting the likes of the most intricate surgical procedure is what was called for. A forensics specialist would have needed help and then only would have ended up with his best estimate, in retrospect.

THE INTRICACIES OF THE PRICE FORMATION PROCESS

Now we are getting to our approach and process. We are building an economic foundation for investing in stocks. We believe that cash flow is:

■ The best way to determine value, and

■ Assure that stocks reflect their intrinsic value.

The current way doesn't price stocks and commodities fairly to approximate their intrinsic valuation. We certainly can see that in the way that oil has been priced over the past few years. Clearly, often it

hasn't been priced on the basis of supply and demand, but more on investor speculation and effort to push up the price. This example shows how price momentum and change can blind and confuse investors. It also shows how the academic assumption that markets are efficient is wrong.

Our model essentially deals with price formation. The purpose is to be able to decompose the drivers of price formation and change, to better comprehend their impact on price formation. Our economic price formation model incorporates economic drivers to better understand the market's reactions as reflected in its pricing of the stock. We can program all these relationships into a system for you to apply—apply to decide which stocks to purchase, sell, or sell short.

This enables investors to determine if the market presently is under-, over-, or fairly pricing the equity based on the intrinsic value of the company. Importantly, it enables investors to avoid surprises as the market price moves up and down. One important value of a good model is its ability to decompose effects as a way of keeping investors and corporate managements from overreacting.

In looking at how the market has behaved in recent years, it is easy to see how sell-side analysts' estimates of earnings and revenues have overwhelmed intrinsic values and changes driven by economics. What a shame!

We go into a fuller explanation in Chapter 13, "Focusing on Price Formation."

A word about information: It plays a vital role in helping investors accurately price stocks by growing their knowledge and insights about the company. The goal of the company should be to provide the market with the highest quality level of disclosure and new information so that it has a full impact on valuation. Tying information to price ranging can close the information gap, reducing herd and psychological impact on price and valuation. Dispersion ranges of bounded rationality[8] (price noise) around the intrinsic value as the anchor contract, making the market more efficient.

Smart managements know this reality; they understand their value drivers and how best to describe and explain them to investors.[9]

Having an accurate read on intrinsic value establishes the role and value of the model. The goal of our model is to be more accurate quantitatively in calculating and measuring a company's intrinsic value. Chapter 9, "Basing Investment Decision on Intrinsic Value" defines our meaning of intrinsic value more fully.

Basically, we use an automated discounted cash flow modeling approach. We believe that an automated DCF approach is superior to multifactor and multiple regression modeling. We set it up in advance and rely on its findings, namely, in processing information inputs to calculate intrinsic values to determine if a stock currently is being over-or undervalued.

It is empirically validated. At that point, any effort to improve it with multifactor modeling becomes an effort to beat an empirically validated 8From Nobel Prize–winning Herbert Simon.

9For an extensive discussion of the associated firm investor relations function, please see "Optimizing the Value of Investor Relations," by William F. Mahoney in *The Valuation Handbook: Valuation Techniques by Today's Top Practitioners*, Wiley, Chapter 21, pp. 544–558.

DCF model, not the market. Utilizing multifactor modeling alone without DCF as the core isn't likely to succeed nearly as well.

Chapter 14, "Our Automated DCF Model—The Better Model"

describes our automated DCF model in intricate detail. Here's a quick description. The model starts with accounting data that is historical, uses a cash economic return to calculate intrinsic value, while taking into account both risk and fade. The risk is in the cash flow growth with the discount rate being a uniform market rate for all firms. Importantly, in the process, we incorporate analysts' estimates and market sentiment and behavior.

Our model combines quantitative automated features with active work by investors and analysts. The model gives them the most accurate intrinsic value calculations available, which are compared against current stock price to determine whether the stock is under-, over-, or fairly valued. Investors bring extensive information to bear in working

the model. They study the sector, industry, and other macro drivers. They analyze the company's fundamentals, drivers of value, and current developments. They analyze operating and financial fundamentals likely to impact corporate performance. All this adds up to having a better understanding of why the market is under-, over-, or fairly valuing the company when compared against the model's intrinsic value calculation. They watch and look for inflection points that likely will drive the price higher or lower. Last, they make their investment decisions.

An intrinsic value analysis offers the opportunity to compare key industry differences and improve predictability. Importantly, our model provides a global perspective.

WE'RE FIGHTING STANDARD PRACTICES,

BUT WE CAN WIN

Certainly, we understand that basing decisions on price levels and not price momentum constitutes climbing a giant mountain, and that it will take some time. Most current models don't reflect price levels; it is price levels that help move investors and the market toward intrinsic values. Thus, the process of moving the market to our process and methods may take a while.

EMT still dominates economic cash flow.

A consistent approach is what matters. Our model seeks steady improvements. Our goal is to have an accepted common approach that covers every sector and company on a global scale. We are working to build a global perspective focused on a model that measures cash return on cash invested, reinvesting free cash to grow the business.

Wouldn't it be wonderful if the market accepted and commonly used a highly accurate method and model for valuing companies and their equity

on the basis of their fundamental value? We could stop having stocks priced on short-term worries and actions that have very little, if anything, to do with the fundamental value of the business and company.

Furthermore, any developments occurring at the time that impact the value of the business could be input right into the model to see their effect on the company's intrinsic value. Our ability to know a company's intrinsic value at any moment would be our basis to determine whether to own, buy more, or sell shares.

We can be confident about our decision because we know the market is efficient enough to catch up or move toward the proper valuation. We have the advantage of knowing that ahead of time.

If everyone was using our process, the range of bounded rationality would contract and the market would be better at pricing stocks at their fair value. In reality, the more factors that get added to a model, the less predictable it becomes. The more degrees of freedom there are in the model, the more unstable it becomes. That is the case with multifactor models. Our model is very narrow and lean.

You will see in our explanations of the model that we are moving along four roads that are less traveled.

1. We use value charts and tracking errors.

2. Our model is unbiased, with half the stocks in the universe under and half overvalued.

3. We calculate intrinsic value as the basis for understanding under-, over-, and fair pricing by the market, which allows tracking of inflection points and new information.

4. We measure risk by linking price change to intrinsic value and other prime factors, which enables us to accurately understand the impact of market sentiment and price fluctuation.

We detail all of these important differences in this book.

KEY TAKEAWAYS

1. Focus on cash flow, not earnings.

2. Terminal values are sensitive to input assumptions. Empirically test their structure with historical data to assure that they are unbiased and accurate.

3. The foundation is intrinsic valuation derived from automated discounted cash flow to estimate where price is likely to head in a price formation process.

4. Price change momentum fails to analyze the fundamentals.

CHAPTER 13

Focusing on Price Formation

We call our methodology the stock price formation process (SPFP). Please think of it as a more accurate way to price a stock, based on being able to estimate the intrinsic value of the company.

In reality today, virtually all stocks are either over-or underpriced. That pricing doesn't derive from an absolute analysis of a company's underlying value. It is based on the relative movement of the market, subject to all that impacts investors by the minute—fear, greed, nervousness, excitement, breaking news, so-called expert opinion, and all the rest.

In contrast, our definition of an efficient market is to truly have most stocks priced near or at the fundamental worth of the business.

Of course, the key here is to be able to calculate intrinsic value accurately. This is best done by valuing the fundamental economics of the company—revenues minus costs—resulting in cash that is used to invest in growth and to reward investors. Importantly, valuations should be both unbiased and accurate—which we will explain in much greater detail.

It's all about money. Isn't that the case universally? Whether we're running a business or a household or our own lives, we survive, live, and grow by having money to pay bills, make purchases, and invest.

Businesses need cash to compensate the owners, managers, employees, and consultants; pay for supplies, equipment, facilities, and support; meet tax obligations; invest in research, new products, production, and marketing; and hire more people to grow. Our model calculates the cash returns being generated by the assets and investments of the business.

Most investors and academics acknowledge the wisdom of using cash as the basis to analyze the value of a business. But they argue that there has never existed a model to calculate intrinsic value accurately. Thus the market's logic: Without that model, earnings work just fine as the operative metric because they can underpin market behavior in a relatively reasonable manner. Indeed, earnings became the metric of choice decades ago—built from the momentum of growing usage, resulting from support by the Securities and Exchange Commission

and other regulatory bodies, and an ever-growing set of practices formulated by the accounting community.

We say the refinement of economic-based cash flow modeling has reached the point of pragmatic and widespread application. Hopefully, it

will lead to universal acceptance. The time has come to move the investing process from accounting-based earnings to economic-based cash flow.

BE PROACTIVE, NOT REACTIVE

The best reason: Our price formation process is proactive; the market itself is mostly reactive. Our models are designed to select stocks based on cash fundamentals, not market behavior, that being mainly overreaction to published earnings.

We have been working with and refining the model dissected in this book for over three decades. We have made numerous adjustments along the way and now can show empirically its ability to calculate the intrinsic worth of a business with a high degree of accuracy.

There always will be room for continuing improvement. Valuing a company will never be a perfect process. That miracle falls into the same category as precisely predicting the price of every stock at any time in the future. Investors call it the Holy Grail and it won't ever happen. No one can predict the future. Of virtually anything.

We encourage investors, academics, and anyone with an inclination to continue refining equity cash-based modeling. We are working hard to accomplish more.

Calculating intrinsic worth involves a multistep process. Calculating a cash return on cash investment is the outcome. To get there, our model incorporates the real world of investing as it unfolds today. It weighs the effects of market sentiment and considers the impact of such vital macro factors as taxation, regulation, interest rates, inflation levels, conflict, politics, and more. Importantly, the model deals with corporate strategies and initiatives to grow and the host of intangible drivers of value characterizing a company and its management.

Financial reporting and data provide the basis to make a gross cash return on gross cash investment calculation. We will explain this calculation later in detail—please be patient. That's historical information. Critical selective financial adjustments serve to improve accuracy and enhance predictability. We describe each of these adjustments in this book. Then we incorporate the effects of our analysis of strategies, actions, intangibles, macro drivers, and market behavior.

In making decisions, investors often rely on the work of professional analysts. We consider analyst research and forecasts to be valuable sources in making the return calculation.

Two pivotal elements in our price formation process are calculations of risk and fade. They go together. Our fade process seeks to determine

how a company will fare in the future; indeed, something of an exact level of returns that can be expected over time. Most companies fade down or regress to the mean. However, some management teams have the skills to sustain higher levels of performance—by renewing themselves or reinventing themselves, fading up as a result. Grammarians, please be kind: Fading "up" is a universally accepted phrase in the investment industry.

An efficiently functioning stock market would have the equity of most companies priced at or very near their intrinsic value. In this environment, stocks are being priced on the basis of the worth and prospects of the business, not on changing market sentiment.

Investors would see the weakness of multifactor models focusing on regressing price change to an event or belief; these are reactionary models.

Indexing would be recognized for its weakness of reflecting market behavior, not the real value of the companies.

Indeed, contrary to popular belief, we think that indexing contributes to making the market less efficient, not more efficient. The continuing expanding use of indexing only adds to market inefficiency as more money is invested based on returns resulting from market sentiment instead of solid calculations of intrinsic value.

Stock Price Formation. What determines the fair price of a company's equity? Identifying, breaking down, and thoroughly understanding the components of the stock price are the basis for understanding the intrinsic value of a company, and thus, the first vital step in the stock price formation process. We submit that the price of a stock at any moment is the result of several key drivers coming together.

Essentially, those drivers are the following:

- Economic performance—measured and reported in financial results.
- Progress and success of corporate strategies.
- A company's intangible drivers of value.
- Macro factors driving the world, country, economy, industry, company.
- Collective investor sentiment and behavior, translated into market behavior and momentum.

To combine these five drivers into a model, we believe, constitutes a road less traveled. Indeed, there are a number of roads less traveled or perhaps not traveled at all, in our approach and model. We lay out all of them for you.

Investors embracing our methodology, using our stock price formation process model in focusing first on the fundamentals of what forms a company's stock price, can readily be called contrarians in comparison to the standard investing approaches found in today's stock market.

But the market has had contrarians for a long time, labeled as investors willing to go against the mainstream. We are putting these contrarians in two camps. First, there are the traditional contrarians (and we know we are generalizing here) who still primarily depend on collective investor behavior and have the courage to go against it. They are using popular investing methods based mainly on regressing a number of what they believe to be key factors against the current stock price to determine what is driving the market at the time. Most of these contrarians employ multifactor models.

Then, there are the true cash flow contrarians, who largely are shunning accounting-driven, earnings-based approaches, moving closer to what we are preaching in this book. These contrarians are using models incorporating pieces of our methodology, such as cash flow return on investment (CFROI), economic value added (EVA), economic profit, and others. We say they are on the right track.

So, our description of a contrarian is deeper, suggesting that we need a new name that more accurately captures our approach. We want it to be a stronger, more graphic word or phrase that is memorable, is liked, becomes a household name among investors, and turns them on to adopting our approach and model.

Clearly, these investors must be courageous, because they are willing to go against the tide. Their investment foundation is economic, not accounting, based. The key performance metric is cash, not earnings. Of course, accounting and earnings are integral pieces of the formula. Their focus is on the cash economic return of the existing assets and return on cash investments in new assets,[1] not accounting profits. Their central financial information resource is the balance sheet, more so than the income statement.

1Bartley J. Madden extended the Miller-Modigliani insight to decompose the Callard, Madden & Associates' intrinsic valuation into the present value of existing assets and the present value of future investments. Bart employed cash on cash returns instead of accounting returns to perform his research. Please see Bartley J. Madden, *CFROI Valuation: A Total System Approach to Valuing the Firm*, Butterworth-Heinemann, 1999, pp. 75–81; and Merton H. Miller and Franco Modigliani,

"Dividend Policy, Growth, and the Valuation of Shares," *Journal of Business of the University of Chicago*, XXXIV, No. 4 (October, 1961), pp. 411–433. See especially

"Section II: What does the Market Really Capitalize? . . . The investment opportunities approach. . . . From him [the investor] the worth of the enterprise, as such, will depend: (a) the 'normal' rate of return he can earn by investing his capital in securities (i.e. the market rate of return) [or cost of capital]; (b) the earning power (*Continued*)

We've been working on a new name for these courageous, economic, cash-driven investors. We are calling them "Cash-Loving Contrarians."

OH-OH: WE'RE PREACHING AGAIN

As we have written, most investors and academics agree that cash is what drives a business. It is necessary to have cash to pay the bills and reward top employees and, most importantly, to continue investing in opportunities to grow the business. What the success and continuing success of a company is built on is managers' ability to earn a healthy return on that cash being invested in growth. While it is best for that cash to come from profits, certainly it also is okay for it to come from borrowings, as long as those investments earn good returns above their costs.

Over time, the best minds among investors and scholars have developed and refined approaches to determine the value of cash in the progress and growth of a business. The accepted base methodology is to calculate the present value of the cash expected to be generated by the business over certain designated time frames—a year, five years, even for the life of the company. Discounted cash flow modeling is the fundamental method for valuing a business.

Investors and scholars have been taking that basic approach, refining it, and improving it for decades. More sophisticated variations of DCF

(*Note Continued*)

of the physical assets currently held by the firm [present value of cash flows from existing assets]; and (c) the opportunities, if any, that the firm offers making additional investments in real assets that will yield more than the 'normal' (market) rate of return [present value of cash flows from future investments.]" Bracketed statements are the authors' insertions to clarify the equivalence of M&M's statements with Bart Madden's extended research into his "model corporation" (see pp. 83–88

of Madden, *Wealth Creation* [2010]). That research treated the firm as an ongoing portfolio of projects; valued the firm's existing assets as the present value of the wind-down of future cash receipts as today's projects are completed in sharp contrast to M&M's perpetuity assumption for today's earnings; and calibrated a cross-sectional CFROI (inflation-adjusted, i.e., real) from the firm's financial statements that was a useful approximation to the real ROIs being achieved at the individual project level.

The decomposition of total intrinsic valuation into present value of existing assets and future investments also becomes relevant to executive compensation. The greater responsibility the executive has for long-term strategy, the greater the proportion of compensation should relate to future investments. For eloquent expressions of this insight, please see the writings of Marc Van Clieaf at MVC International,

http://www.mvcinternational.com.

are at work, developed by consultants, investment managers, investors, and corporations. Beliefs in their approach and methodology among these advocates are strong. In a world where the future cannot be predicted precisely, there is no point in arguing that one or certain ones are right and others are wrong.

For investors, success is judged on the basis of return—return on a stock and return on a stock portfolio. Returns need to be competitively better, which typically translates into achieving or outperforming the investor's benchmark and the equity market as a whole. Real success comes from sustaining solid and better returns over time. We like to think that a veteran portfolio manager who has outperformed the market more than half the time is a successful investor.

For corporations, success is judged on the basis of economic performance, measured in being able to continually grow. For executives and investors today, that means increasing revenues, improving margins, achieving higher profits, and making gains in cash flow. They likely result from smart cash investments in new opportunities and assets. Competitively, it also means maintaining that leading edge in the company's primary product/service offerings and market position, holding or boosting market share.

KEY TAKEAWAYS

1. It's all about money. Businesses need cash to compensate the owners, managers, employees, and consultants; pay for supplies, equipment, facilities, and support; meet tax obligations; invest in research, new products, production, and marketing; and hire more people to grow.

2. Our models are designed to select stocks based on fundamentals,

not market behavior, namely, overreaction focused on earnings. There always will be room for continuing improvement. Valuing a company will never be a perfect process.

3. Cash-loving true contrarians are willing to bet against the crowd by utilizing cash instead of earnings and return on investment models instead of multifactor models.

4. Rates of return form the most fundamental basis: portfolio rates of return for investors; and employing identical principles, rates of return on operating assets within corporations.

CHAPTER 14

Our Automated DCF Model —

The Better Model

Now we need to come up with the best economic cash flow methodology for valuing a business and its securities—both equity and debt.

We recommend and describe our current working model in this book.

The model is continually being refined and improved. We will detail progressive efforts to improve it in a later chapter.

In building our price formation process, we have gone well beyond current discounted cash flow models. Indeed, we examined them closely to identify their limits as an important part of finding ways to build a better model. We describe these comparative studies as well. Identifying the weaknesses of a model is a valuable way to figure out how to improve it.

Our methodology builds from *automated* discounted cash flow modeling.

First we're going to describe the basis and benefits of an automated model and then describe our methodology specifically. "Automated" essentially means that the model can value any one or a combination of the thousands of companies that the investor selects from the database for study without analyst intervention. This means the investor works from information that forms the construct of the model itself, plus various additional built-in active tools designed to enhance the analysis.

Our LCRT universe at this time consists of approximately 7,000 U.S.

companies. We will continue to grow that number, expanding it globally.

A weakness of popular DCF models today is that they can analyze only one company at a time for the current year. Thus, using one of these models is both time consuming and tedious. Further, there is no empirical evidence that making any reliable estimate of the terminal value enables investors to accurately establish intrinsic value in a way that reflects the likely future market price. The chief reason: Investors and academics believe that the numerous model inputs with their many subjective judgments are an adequate method for determining intrinsic values. On that basis, becoming comfortable with any of the many DCF models out there becomes difficult.

No systematic empirical validation exists.

To the contrary, we believe we have developed and successfully tested a DCF model through a vigorous empirical process that improves both the conceptual understanding of valuation while offering to enhance investment performance.

Our initial model derives from an automated DCF method that provides no intervention of analyst input. Right off, the model covers a larger universe of companies than one needing analyst input and judgment. This enables investors to diversify their investigation of stocks for their portfolios. Most importantly, they may then focus their efforts on fundamental analysis. Of course, we later add analyst input to further enhance the value of the model in making buy/hold/sell portfolio decisions.

Our LCRT (LifeCycle Returns) model spreads across virtually all industries. It is not concentrated in just certain ones. The ability to cover a large universe provides empirical validation by enabling you, as an investor, to quantitatively analyze and statistically test the model. Automated models should not rely on anecdotal evidence. They should perform well over the bulk of the equity investing universe.

These attributes of an automated DCF model benefit investors inclined to take advantage of the ability to evaluate a large universe of stocks in managing what amounts to an indexed portfolio. They can select companies on the strength of their fundamentals relative to market price. Indexed portfolios today driven by market price contain considerable market noise that just as likely results in overweighting overvalued stocks and underweighting undervalued stocks. What a shame. It is far better to weight stocks on each company's economic footprint, namely, its intrinsic value.

You can see how wide application of an automated DCF model can minimize herd instincts loaded with high emotion (the authors' included) in estimating intrinsic values to make buy/sell decisions. Be cool. Accurate intrinsic value calculations resulting from the model should detect systematic over-and undervaluation of stocks, avoiding the scourge of pricing bubbles.

Automated models are efficient to operate, making investors cost-wise.

The model achieves economies of scale; costs of analysis are spread over thousands of companies. Compare that with a security analyst who may cover just 15 to 20 companies.

Still, you can add analyst input to the automated LCRT model. This is done with care to make sure it provides an advantage. We built our model to be able to add smart analyst input. That includes yours, as the investor. Once that information is added, the model does the heavy lifting by quantifying how your new input impacts the company's value. Example: You can override the model's normal automated process of estimating future sales and EPS. The model adjusts the intrinsic value based on your superior input.

In this way, our model also is evaluating new information or judgment.

It allows you to see if you really have added value. Our model becomes a benchmark to monitor the investor's (your) opinion and judgment. You can see specifically where your new information advantage has its greatest benefit.

Potentially valuable new information? Some key examples: Recent accounting data, new forecasts, and near-term events.

You can input a vital new inflection point. You can input that

information advantage that you just learned from conversation, a meeting, your own smart analysis, and added insight. You also can use the model to keep out noise, such as changes in terminal values.

Frankly, we observe that many analysts adjust their terminal value assumptions to assure the intrinsic valuation comes close to the current market price. These subjective terminal value assumptions reduce the independence of the analysts' forecasts from the current price. Therefore, they may bias the results, reducing the predictive capability of the resulting intrinsic valuation to move toward the fair price. Evaluating a model through rigorous empirical testing from historical data eliminates this natural terminal valuation bias arising from subjective analyst inputs.

FOUR PRIMARY MEASUREMENT PRINCIPLES

TO EVALUATE A MODEL

In our three-plus decades of work in building models to invest in stocks, we have developed four primary principles to evaluate the performance of a model.[1]

1. Robustness. This determines the size of the universe of stocks the model can reasonably value.

2. Accuracy. This answers the question of whether the model's intrinsic value estimations are close to actual market prices.

3. Nonbias. This helps us understand if the model systematically avoids over-or undervaluing the stocks within its scope and against economic drivers.

1For another very useful perspective on these measurement issues, please also see the well-respected Thomas E. Copeland's work in Chapter 4, "Comparing Valuation Models," *The Valuation Handbook: Valuation Techniques from Today's Top Practitioners*, Wiley, 2010, pp. 67–107.

4. Predictability. This determines whether the model forecasts stock returns rather than simply estimating current market prices.[2]

We believe that a good model incorporates all four evaluations.

Critically, we further believe that models delivering robustness, accuracy, and nonbias offer the highest predictability. An effective model provides an accurate value of a company that forms the basis to make a smart investment decision.

Please see Chapter 30, "Comparing Our Model against Three Popular DDMs," which covers these core measurement principles on the details of how best to produce a good model.

KEY TAKEAWAYS

1. Our automated DCF model enables investors to activate the comprehensive analysis of all 7,000 companies in our database at will, rather than having to manually analyze one company at a time.

2. Our model covers all industries and companies within them, enabling investors to evaluate a large universe of stocks in managing their portfolios.

3. Our model achieves economics of scale in analysis, making investors cost-wise.

4. Our model offers the flexibility to add analyst and the investor's own input, capitalizing on an information advantage or early awareness of a major upcoming inflection point.

5. Our decade of research has yielded four primary principles to evaluate the performance of models: robustness, accuracy, nonbias, and predictability.

2We can add a fifth measurement principle for executive compensation purposes, explanatory power. This book does not address strategic planning and corporate governance issues in depth, so we only mention explanatory power in this footnote.

Explanatory power measures the correlation of the fractional rank of daily average total shareholder return over a year to intrinsic value return lagged about three months to account for the public release of financial disclosures.

If corporate managers were compensated on the economic drivers of intrinsic valuation, these compensation plans would avoid the confusion of paying for price noise of under/overvaluation inherent in stock options. Managers would know the economic levers under their direct control that impact intrinsic valuation. Compensation plans based on the economic drivers of DCF-based intrinsic valuation would

more closely align managements’ interests with those of shareholders. Executives more likely would focus on cash-based long-term strategies, rather than quarterly EPS surprises.

CHAPTER 15

Getting to Know Our LCRT Model

Afull working comprehension of our model is best accomplished by conquering the content of:

Chapter 14: Our Automated DCF Model—The Better Model Chapter 15: Getting to Know Our LCRT Model

Chapter 16: Digging Deeper into the LCRT Model Chapter 17: Putting Our Valuation Proposition into Perspective Chapter 28: Incorporating Risk into Our Model

All five chapters are based on our automated discounted cash flow upgrade. They explain our calculations of risk and fade, dissect the LCRT

methodology, and our training built into our ValuFocus model implementation process that together enable you to master what we believe you will agree is a new and better way to invest in stocks.

Three features distinguish our economically based discounted cash flow modeling process. They all center on the accuracy of the model itself.

1. First and foremost, our model focuses on the economics of a business, namely, its cash economic return, and not on what over time has become a highly sophisticated, highly manipulative, virtually self-serving accounting game.

2. We have developed greater accuracy in estimating a company’s intrinsic value, built on cash: cash generated by the business, cash to pay the bills and reward investors, and cash to reinvest in continuing to grow.

This good reading of intrinsic value has as its foundation a thorough analysis of the fundamentals of the business: qualities of management, products, services, operations, technologies, employees, R&D, manufacturing, marketing and all the rest that spell performance. The key measure involved in this method is the cash economic return—a company’s CER.

3. We have developed better ways to measure fade1 and risk, specific to each company. Our work on fade enables investors to predict a 1Fade is quite similar to the often used term in the academic literature, regression toward the mean. However, LCRT's fade, in its actual arithmetic, is not identical to regression toward the mean. Startups initially fade toward a level above the mean.

company's level of performance in the future, estimate a timetable for how that performance will play out, and use that intelligence in making buy, hold, and sell decisions. Our risk analysis is quite intricate, the results of years of analysis and testing to quantify the risk level of an investment. We describe the risk measurement process in Chapter 28,

"Incorporating Risk into Our Model."

Together, these features of our model give investors confidence that they can manage portfolios containing stocks that are truly undervalued and likely to rise in price as the stock market recognizes the opportunity, and sell overvalued stocks early to lock in any price gains.

ADJUSTMENTS TO IMPROVE DCF MODELING

Key adjustments are the critical elements in improving the DCF model.

Our model builds on the economic foundation of cash flow to manage and grow a business, rather than the accounting base of earnings. Thus, we start with discounted cash flow modeling—discounting to present value by applying a discount rate that typically runs into perpetuity. Then we work to improve it.

Improvements in our model largely relate to the series of adjustments. These adjustments are critical to improving the model by making it more accurate in computing intrinsic value, forecasting the company's performance—complete with fade levels—and measuring the risk in the investment.

ECONOMIC OUTPUT AND LIFE OF EACH ASSET

The vital start point estimates the economic output and life of each producing asset managed by the company.

It is important to calculate the cash-generating ability of each asset throughout its lifetime. So we estimate asset life and levels of cash generation.

We treat depreciating assets as having a finite life. Most often, their cash flows decline gradually for years and then decline more rapidly.

Interestingly, technology is shortening asset life, especially for companies highly dependent on applying technology to expand revenues while being driven competitively to keep their technology edge. For computer and software companies today, assets can have a three-to four-year economic life, even though they are capable of generating output for maybe six to eight years or more.

Standard practice has been to use accounting measures to specify asset life, specific to each asset. But, as an investor, you want to know an asset's economic life. We define economic life as the time over which the asset generates cash flow. Accounting practice looks at it as gross plant life, divided by depreciation. For us, it is a question of cash versus earnings. It is an issue of returns on a depreciated basis, versus cash on cash return. We work with the latter. This is one of our key adjustments.

We believe the cash economic return reflects accurately the IRR (internal rate of return) of the underlying assets.

As an investor, we must know the asset's economic return, length of time it will generate that return, its fade levels, and when the asset needs to be replaced. It is better to value all assets on their economic life. This also serves as a highly useful way to measure how well management is doing with the cash provided by investors.

Essentially, we are calculating the life of each asset better than current models through a critical series of adjustments. It is critical for the adjustments, parameters of the model, and the model structure itself to work in unison to validate the discounted cash flow methodology empirically.

Our combination of adjustments provides the insights to make accurate estimates of a company's intrinsic value.

For serious stock investors like you, an excellent book to read is *Wealth Creation: A Systems Mindset for Building and Investing in Businesses for the Long Term*, by Bartley J. Madden.[2] Bart Madden is among the very top thinkers in understanding how to translate business performance into smart stock investment. He is a strong advocate of cash flow methodology, focused on the economics of the business. His latest book describes the wisdom of a systems approach for connecting the underlying knowledge-building activities of the firm to accounting data and to market valuations.

This bottom-up perspective on the economy leads to a deeper appreciation of how free-market capitalism promotes competition that ultimately benefits consumers.

Bottom line: In their pricing of stocks, we believe, current models don't do a good job of analyzing a company's economic fundamentals to enable investors to be confident in moving the price from market level toward intrinsic value. Our model provides these important insights.

CAPITALIZE CASH FLOWS

With cash serving as our economic driver, we capitalize cash flow expenditures that produce benefits longer than a year on a company's balance sheet 2Wiley, 2010.

when they are material to understanding the economics of the business. This means we are capitalizing such material value drivers as research and development, operating leases, advertising, training, other intellectual capital, and intangibles. These are valid economic assets that impact performance.

The important reason for capitalizing these expenditures is that they impact both the cash economic return and the sustainable growth rate.

We cite Burroughs Wellcome Company a few years ago as a good example of capitalizing expenditures. It was capitalizing research and development (R&D), and because it was a mature drug company, the action had little effect on intrinsic value. It was restating cash flow and capitalizing R&D that previously had been expensed. This serves to move the R&D

costs from the income statement to the balance sheet, thus changing the economic life of the R&D. While the net effect was minimal, the accounting is proper.

Our modeling alerts investors when a company recognizes too much revenue and isn't booking a proper amount of expense. That action by management isn't right. The model makes corrections, namely, to make accurate reads of revenue and expense. Then, it translates these corrections into proper estimates of intrinsic value.

A not-so-uncommon example involves a company letting inventories and receivables rise faster than sales. This will show up in the model as an intrinsic value difference—a before-and-after adjustment.

UNDERSTANDING ABNORMAL ACCRUALS

A company fudging on receivables and inventories will impact intrinsic value. It shows up in the financial statement as an abnormal accrual. This is useful information to investors. They are alerted that the company might be fudging the numbers or there are abnormal accrual risks. The situation is being reported, and thus it can be properly analyzed to capture the effects on intrinsic value. Factor model users will want to know the level of abnormal accruals. Our LCRT model users will want to know the quantitative impact on intrinsic value—not just a flag that a problem might exist.

I might add that managements sometimes are na¨ıve about just how astute and investigative investors can be. Corporate finance people should know that investors are employing forensic accounting analysis.

The key question in an abnormal accrual is the amount being fudged. It is a forgery of the economics; the amount constitutes a fundamental change in the economics of the business. Management should realize that investors will demand an explanation. Executives should anticipate the question and be ready with an economic explanation. The question: How much is

fraudulent reporting and how much is fundamental economic change, such as extending receivables or increasing inventory, to better serve customers?

This is, in effect, a reverse adjustment, namely, an abnormal accrual done properly in reverse. It is an off-balance-sheet action resulting in a

lower cash economic return, leading to a new valuation. It is a big deal. Asset productivity falls. Money is being taken out of receivables, which reduces gross cash flow. It is intrinsic value–centric. Our models do the work; they extend forensic accounting.

We look very closely at accruals, being especially on the lookout for abnormal accruals. In both our Production and Research model versions, we calculate intrinsic value before and after accounting for abnormal accruals.

When an accrual is abnormal, the result can be a sizable number; in other words, the accrual can have a major impact on intrinsic value—positively or negatively. We have developed ways within the models to flag this kind of bad behavior. On the average for all companies, our studies have indicated that intrinsic values are more accurately calculated before taking into account the abnormal accrual(s). These results suggest that most firms are accurately reflecting the economics of the business when presenting their results. However, these average results don't apply to every single company.

In determining earnings, abnormal accruals can indicate fraud, and they just might call for some sophisticated forensic accounting investigation. We actually have incorporated ways into our model to quantify the impact of dishonest abnormal accrual accounting. We see it as a quality of earnings issue. We seek to answer the questions surrounding whether the earnings being reported are complete, whole, or impaired. Here we are talking about integrity, honesty, ethics—you can put your words to it.

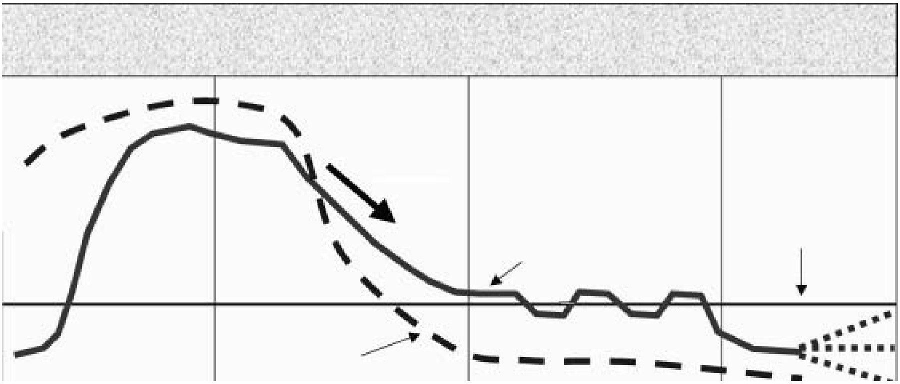
CASH FLOWS FADE: DOWN AND UP

Our process for calculating a company's fade stages is unique and much more accurate than what has long been standard practice.

As Figure 15.1 illustrates, fade is the natural process in which a new company with winning ideas, technologies, products, and/or services takes off; grows revenues, cash, and profits; becomes a market leader; then levels off, matures, and hopefully is able to continue at a steady pace for many more years. Of course, some companies that have lost their edge are acquired or eventually go out of business. And some, usually fewer, fade up, growing again at rising levels, probably because of a new technology or product or a really smart new management team.

We start with the fade process built three decades ago by bright

investment minds running the Callard-Madden group and HOLT Value



Failing

High

Competitive Fade

Maturity

Business

Innovation

Model

4 Fade

2 Long-Term

Cost of

Capital

1 Economic

Returns

3 Reinvestment

Rates

FIGURE 15.1

Firms' Competitive Life Cycle

Reprinted with permission from Bartley J. Madden. This material is reproduced with the permission of John Wiley & Sons, Inc.

Associates in Chicago. I had the privilege of being part of both of those teams, a partner and the "T" in HOLT. In estimating a company's fade pattern, these firms developed a seven-year startup period, followed by a 27-year fade to the corporate average, leading to that mature level state covering the rest of the company's life. Scholars have labeled that final or ending time as perpetuity.

In improving the earlier work, we switched to an exponential fade; we have found this method more accurately measures a company's life cycle.

We calculate fade on the basis of the company's cash economic return rather than using the more popular linear fade based on CAPM theory.

Our fade methodology is an integral part of our price formation process. This link is far more realistic. We are relating fade to intrinsic value and stock price as we watch the market move the price toward intrinsic value.

LOOKING AT THE DISCOUNT RATE

Added up, the market-derived discount rate incorporates size, cost of capital, and leverage adjustments. That doesn't seem right. Our model uses a 5 percent real discount rate. That 5 percent rate produces unbiased intrinsic value estimates, leaving 50 percent of the firms undervalued and 50 percent overvalued.

Look at what happens when you use a discount rate that includes the effect of fade. With its high rate, Microsoft in its heyday is a good example.

The investor has to raise the discount rate when there is little or no fade.

That makes Microsoft look mighty risky.

Why? The market raised the discount rate instead of including the

effect of fade. We compare Microsoft to a buggy whip company that is losing money but still is stable. The company has borrowed big and has negative earnings. If it is a young startup, we assume a fade up to produce positive cash flow. To model startup effects, we must reduce the discount rate.

That makes no sense. What does make sense is to put the fade effect into modeling cash flows explicitly.

We are estimating certainty-equivalent cash flows. We are putting the risk in the cash flows. We explain certainty-equivalent cash flows more in Chapter 16 in the section "Certainty-Equivalent Value and the Use of the Area under a Curve."

This brings us to our Research model. In it, we extend beyond our Production model by putting the leverage effect (debt) into the certainty-equivalent cash flows and not into the discount rate. It is a road less traveled, but a highly practical trip.

Chapter 28, "Incorporating Risk into Our Model" adds substantial detail on our risk and fade modeling process.

SUMMARIZING THE MODEL OF CHOICE

In sum, there are significant differences in our model compared with others. We are making adjustments; substantially in accounting practices, through our fade calculations, boundaries of rationality, incorporating market sentiment, inflation, and other factors. We are not simply regressing multiples to price within an industry. This is a road much less traveled.

We believe our studies to measure fade and determine the best way to account for risk clearly favor adopting LCRT modeling as your stock investing basis.

Our focus is on price level and not on price movement. We transform the sustainable growth rate into an expected growth rate. We find a common measurement that covers every industry and company. We offer economic comparability on a global scale.

We provide a proper focus for investors: cash return on cash invested, with increases in value resulting from smart additional capital investments.

We account for key industry differences: assets, asset mix, asset life, amount of depreciating and nondepreciating assets, size, and cash

return.

Our intrinsic value analysis offers a vital level of comparability. It certainly is better than those presently being used by the market. It improves predictability.

Compare all these features against multifactor modeling. Factor models become less predictive as you add factors and regressions, namely, by

industry, year, size, EBITDA, and more. These models are adding degrees of freedom. Some have as many as 800 degrees. The more degrees that are added, the more unstable becomes the model, and the more divorced it is from cash-based economic drivers.

In comparison, our LCRT model uses the same fade methodology for all companies. It uses the same discount rate. We probably have between 60 and 70 degrees of freedom, covering 7,000 companies for over 10

years. Our model is very lean. In contrast, too many factors cause too many explanatories. You are better off without it. Our approach is called parsimony—thriftiness or frugality in employing a limited number of core economic drivers.

THE NEXT GENERATION WILL BE EVEN BETTER

Right now, we have a solid model for you to work with.

But we always are pursuing continuous improvement.

Our expanded price formation process waits in the wings. We are working hard to bring it to reality.

We present the total picture, still to come. We start with our base of calculating intrinsic value (IV) through our IV model, overlay the grounded rationality found in the good work of analysts, employ steady state distribution as a better risk measure, and incorporate the insights of multifactor modeling to have a good understanding of the "noise."

Stated another way: We overlay the labor-intensive work of analysts

on our automated DCF model. Our goal is to make the very best use of analyst insights and other modeling. In bringing together our solid automated DCF

modeling with the output of the smartest stock analysts and modelers available, we are combining the best, not fighting them.

We believe it is important to continue our own product development as we move to a fuller process of valuing companies. Our goal: Develop a macro model of asset valuation, using intrinsic value as the basis to determine over-and undervaluation of each and every asset. We're not there yet.

What is needed for a complete model:

■ Having the macro model to begin with.

■ Having data back to the 1950s to gather and incorporate all regime changes, inflation, investor tax rate changes, economic growth rate, and other drivers.

■ Extend backtesting to longer than five years.

■ Extend from annual to quarterly data and maybe an even more timely frequency.

■ Be totally global.

■ Ensure that the best analysts are participating in the process.

The analyst overlay advantage includes their good work in capturing highest-quality information to further strengthen the accuracy of the valuation model. It also is critical to capture that data quickly.

A tremendous advantage is to be gained by being the first to incorporate all the outstanding analyst insights into the model. This highly valuable information will enable us to overcome a current weakness, such as a company whose real value isn't reflected accurately by the model. I'm thinking here of General Motors, which for years has been shown by our model to have an intrinsic value much higher than it was in reality.

Bottom line: Let the model do its best, benefit from analyst intervention in situations where the model isn't working well. We are

putting in the extra effort to build value-relevant information that matters. This will be accomplished by adding the input of star analysts who can forecast the future accurately, incorporating off-balance-sheet liabilities and other critical information and analysis. We intend to have the inputs of the best analysts in our model. In fact, their insights from intrinsic valuation outliers eventually will guide data vendors to additional value-relevant data to collect for all companies.

Our model of the future likely also will be a hybrid of our current Production and Research versions. We have found cases where one works better than the other, although we find the Research model being more accurate and predictive most often.

KEY TAKEAWAYS

1. Four features, all based on accuracy between price and intrinsic values across the universe , distinguish our economically-based discounted cash flow modeling process. Here is the LCRT framework.

■ It focuses on the economics of a business.

■ It develops greater accuracy in estimating a company's intrinsic value, built on cash.

■ It develops better ways to measure regression toward the mean or fade of returns and growth. Our work on fade enables investors to predict a company's level of performance in the future, estimate a timetable of how that performance will play out, and use that intelligence in making buy, hold, and sell decisions.

■ It places risk effects, like financial leverage, into our specification of the cash flows instead of into the discount rate.

2. Together, these features of our model give investors confidence that they can manage portfolios containing stocks that are truly undervalued and likely to rise in price as the stock market recognizes the opportunity, and sell overvalued stocks early to lock in any price gains.

CHAPTER 16

Digging Deeper into the

LCRT Model

In digging deeper, we are exploring some of the advanced features of

the LCRT models.1 For those who have had enough with the details of model building, proceed to Chapter 17. If you want to focus on Rawley ranges of bounded rationality, proceed to the section "Calculating Bounded Rationality (Rawley Ranges)" in this chapter. Still, we encourage you to continue reading chapter by chapter. There is much more to be learned in this chapter.

EXPONENTIAL FADING OF BOTH CASH ECONOMIC

RETURN AND GROWTH RATE

We have mentioned earlier the concept of exponential fading. Fading both CER and growth rate has come about by investigating the nature of competition. Companies adopting new technology by deploying capital immediately find competition cutting away at that initial advantage. The innovation-based increase of cash economic return (CER) and cash flow growth rate is reduced over time as profit margins are squeezed.

As experienced investors, we must recognize this effect. The upward thrust of the new technology investment is steep initially, but then the rate of increase starts to fall and eventually levels off. As time passes, the upward thrust is negated entirely and cash flow begins to slip. Each year shows a more rapid decline in cash flows. In the later stage, the slide slows as it approaches a steady state. This is what we call an exponential decline. The decline can happen in just four to five years in a dynamic industry with short economic asset lives, but may take 20 to 30 years in less dynamic industries.

Cash flows fall in patterns similar to the technology adoption curve.

Exponential fading models this phenomenon. To be effective, we must fade both the asset growth rate and the CER, which measures those assets 1With the help of Lee Hayes, head of Genesee Investments.

that create the cash flows. These two separate fade rates create the combined exponential fade rate.

Two critical numbers are needed to calculate the exponential fade.

We must identify the initial starting point (where we are), and the final parameter (steady state). The fade rate then determines the number of years for this transition to take place. In the case of CER, we call these two critical numbers the beginning CER and the steady-state CER or fade-to CER.

We call the asset growth rate the sustainable growth rate (initial) and steady-state country GDP growth rate (final steady state). The length of time will vary depending on the size and nature of the company between four and 20 years. To model this properly, we use a fade-to rate in the calculation.

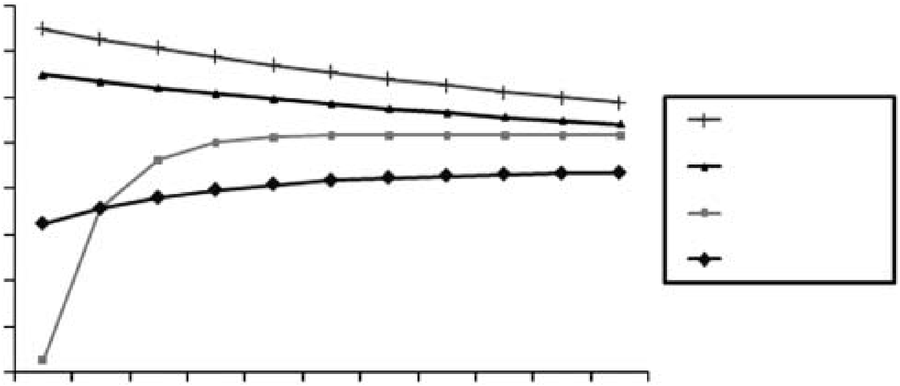
It can be high for small startup firms that are building their intellectual capital and much lower for large firms. Negative CER companies are likely to have a high CER in the intermediate time period and large firms to have a steady CER.

Companies are dynamic and can often rejuvenate themselves to change this fade. We call this dynamic behavior beating the fade. You want to own companies that can beat the fade. Helping investors do that forms the reason we calculate the fade-to rate continuously. As new information comes in, the fade-to rate or steady-state rates change. Importantly, we are seeking to capture expectations in a world of uncertainty. Expectations are built into every intrinsic value. We prefer to use the term *market expectation*. The market determines value by expecting the company's cash flows to fade to the mean. That's why we use it.

We start with the CER. Our research over decades shows that cash economic returns fade to about an 8 percent average (steady-state CER). Overall, steady-state CER rates run between 8 percent and 9 percent—higher for outstanding operational companies and small startups, less for larger and failing companies. Steady-state CER and the fade rate are integral parts of the CER calculation. This fade rate ensures our ability to calculate the right kind of curve. This makes sense. Small companies exploiting new markets have greater opportunity to invest in high-CER projects than large mature companies. The current CER is calculated through current operational financial data. Often, the CER is negative. We can calculate annual CERs and their associated cash flows once we have these two points on the curve and know the fade rate based on the size of companies to reach the steady state.

Growth rate is impacted by the amount of dollars to be reinvested and by the CER. Large firms tend to have more investment dollars but

lower CERs. Companies accumulating cash probably don't have high-quality projects to invest in. These companies often buy back company stock and declare dividends to reduce the cash, rewarding shareholders in those ways.



Accumulating cash, buying company stock, or paying dividends aren't the worst things a company can do. They don't destroy value; they just don't increase it. Companies sometimes make bad acquisitions (businesses with returns below the cost of capital) or invest in low-CER projects.

These actions destroy value. The growth rate starts at a sustainable rate, then moves to the country GDP growth rate as the company and industry mature. Bad investments accelerate this process.

What is the sustainable rate? It is the rate of growth that can be financed internally through cash flows. The market rate is the rate the industry as a whole can grow. Companies tend to grow at the sustainable rate until they no longer can deploy all of their cash flow. Microsoft is a great example.

Year in and year out, Microsoft has continued to accumulate cash. In its case, we do not use the sustainable rate, but the market growth rate.

In our research, we have analyzed this phenomenon in detail. The size of the firm makes a big difference in whether the CER is positive or negative.

Figure 16.1 identifies the core relationships.

Small firms with high CER tend to fade more slowly over a number of years to a steady-state CER of 8–9 percent. Large firms tend to fade faster to steady-state CER. To see the whole picture accurately, the diagram in Figure 16.1 would have to go forward 30 to 50 years, but that would diminish resolution on the most important near-term decade. At three to five decades forward, all firms will be in the 8 percent to 9 percent CER

range. Of course, over that extended time frame, the large firms may have become small and the small firms large.

Small negative CER firms tend to fade up quickly to above the steady-state CER. Through most of that time period, small CER firms with low CERs are outpacing the large firms with low CERs. These small companies 80

60

40

Small High

20

Large High

0

Small Low

−20

Large Low

−40

−60

Cash Economic Return −80 0 1 2 3 4 5 6 7 8 9 10

Year

FIGURE 16.1

Cash Economic Return Fade Pattern

This material is reproduced with the permission of John Wiley & Sons,

with no earnings still have a value. After all, investors purchase startups not because they currently generate positive cash flows, but because they expect large cash flows in the future. The way to model this effect is to place a higher fade-to rate for the cash economic return for small startups that have a negative beginning CER. We discuss options functions to model small firms' cash flows later to get a more accurate CER.

There also is an interesting relationship between beginning CER and firm size and the CER (fade-to rate). See Figure 16.2.

Steady-state CER or fade-to rate depends on whether the beginning CER is positive or negative as well as the size of the firm. The horizontal axis has the beginning CER. The vertical axis has the steady-state CER or fade-to rate used to determine the exponential curve of the CER through time. The exponential curve enables calculating the cash flows of net income plus depreciation each year.

For small-to mid-cap–sized companies, the steady-state CER rate is high if the beginning CER is negative. The more negative the beginning CER

for small firms, the greater the fade-to rate. Also, the smaller the firm, the higher the steady-state CER. Size matters.

In addition to modifying the fade rates for small firms, we also must do some special things to the cash flows. Small firms' cash flows potentially can go in many directions; up one year and significantly down in another. To deal with this pattern, we apply option pricing theory to gain a better understanding of the intrinsic value of startup businesses with negative current cash flows. The goal of investors is to gain a more accurate reading of intrinsic value. This method replaces discrete cash flows with a distribution of potential cash flows. This distribution is converted to a certainty-equivalent Smallest Firm

–

Smallest

100

StartUp

Medium Size Firm

o 35

Firms

Largest Firm

30

ade-T 25

20

y-State CER or

15

10

End-CER-F

Stead

5

Largest and Smallest Firms

0 − 100 − 50

0

50

100

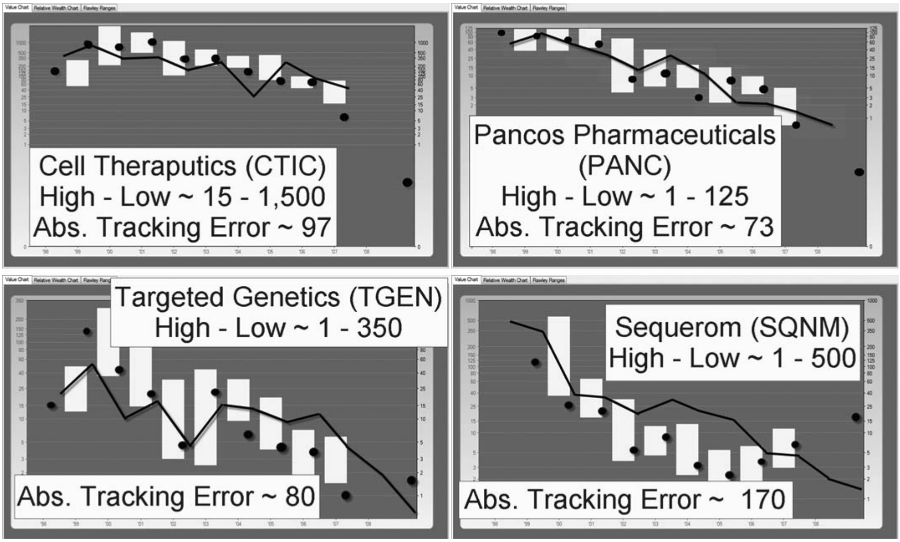
150

200

Beginning Cash Economic Return (CER)

FIGURE 16.2

Relationships of Beginning Cash



value for calculating intrinsic value. We deal with certainty-equivalent value next.

CERTAINTY-EQUIVALENT VALUE AND THE USE OF THE AREA UNDER A CURVE

We seek to improve the accuracy calculations of the intrinsic values of small companies by using a point of central tendency function; the inputs can vary widely in the future. This technique is used to model the cash flows of small companies, while also dealing with the probability of distress in corporate debt. The formulas are similar to those used to price stock options in which future price movements become a probability distribution described by a mean and variance.

Applying these functions in the CER calculation, the value of the numerator cash flows becomes a certainty-equivalent intrinsic value. With small companies, think of this process as a scenario analysis to determine the most likely outcome. We do not know precisely the future cash flow path, but this technique gives us the best estimate of the weighted average of all likely future cash flows. How accurate are small company intrinsic value estimates using this method with advanced fade techniques? We have found that we can arrive at high

accuracy (based on absolute tracking error) on many small firms through this unique automated option approach.

See for yourself. Figure 16.3 illustrates the tracking of this option pricing intrinsic valuation methodology, applied to four small startup biotechnology firms.

FIGURE 16.3

Value Charts for Four Small Biotech StartUp Firms

The black lines piercing the fiscal year high-low prices represent LCRT's option pricing intrinsic valuation model for small startups with large negative cash economic returns. The black circles represent the price at fiscal year + 3 months—the three months necessary to properly reflect the disclosure lag for reporting financial results to the SEC.

Of course, tiny startups possess huge price ranges. (Please note the sem-log vertical scale used in these charts.) Large uncertainty exists for what the future holds for these firms. So, the absolute tracking errors are all high, relative to larger, more mature firms. However, the fact that the LCRT

research model can even track the high-low prices automatically without any analyst intervention represents a radical breakthrough in valuation research.

The reason that LCRT could accomplish this valuation breakthrough is our unique ability to establish driving parameters that eliminate bias by guaranteeing that 50 percent of firms are undervalued and 50 percent are overvalued. To our knowledge, no one has ever accomplished this before!

In fact, the traditional approach demands that an analyst model the cash flows for each firm and for each year at a time with a multiyear forecast.

We are not suggesting that analysts don't play an important role in valuing startup firms. They can play a vital role. Analysts can add much value to the investment process for forecasting inflection points in operating components by their intimate knowledge of the company,

phase of product development, competitive position, and likely one-to three-year forecasts.

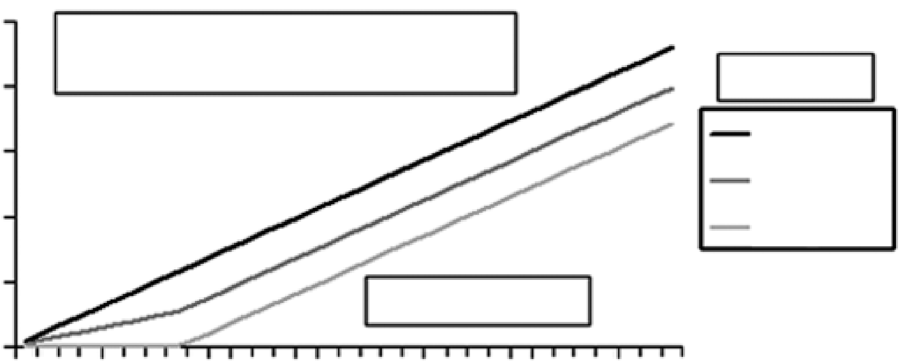
We are strongly recommending that employing the LCRT option pricing model as the terminal valuation choice can combine the best of both approaches to more accurately predict price movements.

Predicting distress represents a similar problem. When small companies take on even limited debt, the probability of distress rises, impacting the intrinsic value. We have found the best way to handle this situation is with option-like functions. By distress, we chiefly are looking at bankruptcy, in which the assets of the company are given to the bond holders. An option-like function can deal with the probability of default nicely. We describe use of the call function in dealing with leverage in the next section.

DEALING WITH DEBT LEVERAGE

Debt leverage can have a significant impact on intrinsic valuations. The traditional approach is to increase the discount rate for companies with high leverage. However, we prefer to place the risk into the cash flows.

Figure 16.4 illustrates how to put financial leverage risk into the cash flows for small, medium, and large firms. We accomplish risk measurement in the cash flows by estimating a percentage loss of enterprise intrinsic valuation from higher financial leverage.



50

Deadweight Financial Distress

Costs of Higher Leverage

Firm Size

40

Smallest

30

Midsize

20

Largest

Intrinsic Value 10

Call Functions

% Loss of Enterprise

0

0

25

50

75

100

125

150

% Debt to Debt Capacity (PV of Cash

Flows from Existing Assets)

FIGURE 16.4

Effect of Financial Leverage on Intrinsic Value This material is reproduced with the permission of John Wiley & Sons, Inc.

What is the best way to measure debt? Is it debt to book capital (debt

+

equity)? Or is it book debt to market capital (book debt + market equity)?

Academics say using market value of both debt and equity is the theoretically correct method. However, debt measured in this way creates a fatal problem in statistical model building: Equity price appears in both the dependent variable and in the independent variable. Appearing in both variables causes spurious correlation. We need an independent variable that is, in fact, independent of equity price.

Since we are cash-loving contrarians, we follow a unique empirical approach, not applied elsewhere to our knowledge. We measure the percent debt to debt capacity, in which debt capacity arises from our intrinsic valuation of the present value of cash flows from existing assets.[2]

Traditional finance theory says debt leverage is a smooth function. It starts at zero, rises, and reaches the point when the company shouldn't add any more. That is not what our data show.

For the smallest firms, the loss of intrinsic valuation from additional debt becomes immediate. However, the largest firms gain an advantage from their size. The loss of intrinsic valuation for the largest firms does [2]Please recall the great insight mentioned earlier by Miller and Modigliani and later adopted by Bart Madden. That insight decomposed the total intrinsic valuation into the present value of cash flows from existing assets and the present value of future investments. Our data suggest, sensibly enough, that lenders don't care much about future investments—only the cash flows from existing operations.

Bart also suggests an added refinement: the fungibility or liquidity of assets.

Airplanes are easier to sell than electric power plants.

not begin until it reaches about 35 percent book debt to debt capacity.

The LCRT research system models this 35 percent empirically derived debt threshold as a "call-like" function in order to produce a smooth

function at the threshold point, without any kinks.

Medium-sized businesses face financial leverage costs at a weighted average of the smallest and largest firms. We are applying one smooth, continuous function to small, medium, and large firms. As a result, no discontinuities or kinks exist in our modeling. We are not aware of anyone else modeling debt leverage effects with smooth functions across the entire universe in this way.

Two impacts result from a company borrowing for the first time. The company gains a new, second group of investors, and it takes on covenants, namely, restrictions on management behavior. These can be costly, depending on how well or how poorly the company does. Effectively, the company is buying the option of putting the assets in the hands of the debt holders; in bad times, the debt holders are being forced to take over.

Managements need to be super careful in how they build their capital infrastructure. Executives should consider the cost of debt in terms of its impact on valuation and in terms of giving authority to a second set of investors. Debt impacts intrinsic value—positively or negatively. For investors and analysts, debt further clouds the ability to calculate intrinsic value.

Realistically, the company now has two classes of holders. It is buying the option of putting the assets back with (not to) the debt holders if the company falls apart. As a result, cash flow declines are not smooth. It is similar to increasing the discount rate above a certain inflection point.

The lesson for corporate managements: Borrow just enough to meet strategies and goals and implement operations. Then, management can avoid distress and bankruptcy.

LOOKING AT THE DISCOUNT RATE AGAIN

Now we come to the important discount rate.3 The question is how best to arrive at a discount rate. We place all of the company's risk into 3For a more in-depth discussion of LCRT's real discount rate compared to traditional ones, please see Rawley Thomas and Robert J. Atra, "The LifeCycle Returns Valuation System," *The Valuation Handbook: Valuation Techniques from Today's Top Practitioners*, Wiley, 2010, pp. 300–302, "Appendix: Market Derived Discount Rates and CAPM Beta Costs of Capital."

market-expected certainty-equivalent cash flows. Surely, that's a mouthful, but it's simple. It is the amount of cash the market expects the company to generate. Traditional DCF and capitalization models use a build-up method based on CAPM, plus key factors unique to the company itself. These may include interest rates, inflation, commodity and other industry prices, and more. One of the major factors determining the discount rate is the uncertainty (risk) of the cash flows. This means every company has a unique discount rate. We think there is a better way.

On a road less traveled, our advanced LCRT model employs a single real cost of capital for discounting each year. Because all the risk is in the numerator, we can use one discount rate for the entire universe of stocks.

The second issue is how best to determine that discount rate for, say 50 years. Formulas that have been built up over 20 years on this subject probably are not worth repeating in detail, but they generally include the risk-free rate plus a risk premium plus a liquidity premium, and so on. We have a problem with these approaches, because no one has observed a truly risk-free rate, and no one can agree on the long-term risk premium. After the 2008 stock market meltdown, the liquidity premium also appears to be a difficult concept that can vary greatly over time.

We have come up with a unique solution to this problem. We let the market determine the long-term discount rate it is using. This rate varies over time based on market sentiment and country-by-country economic fundamentals.

Still, we continually calibrate the rate using our special technique.

We use our intrinsic value information and our market price data to determine which real discount rate causes 50 percent of the entire universe to be overvalued and 50 percent to be undervalued. This gives us the right discount rate for each individual company's cash flow. Because the risk is in the numerator (cash flow), our market-derived discount rate is the one rate that can be applied to all companies.

You may say, "Wait a minute; you are using intrinsic value to determine the discount rate and the discount rate to determine intrinsic value. Isn't this circular reasoning? Doesn't this type of reasoning cause circular reference errors in Excel?" The answer is no, because we are dealing with the entire universe to determine the

interest rate that will produce zero error between intrinsic value and market price for the midpoint of the universe (where 50

percent are overpriced and 50 percent are underpriced). Thus, this is not circular reasoning. The functions we use are similar to Excel's goal seek.

Once this parameterization research has been accomplished, we have found the most likely market discount rate actually being used at any point in time. Our empirical testing reveals that this market-derived discount rate is stable over time.

Of course, we continue to recalculate this discount rate every period to maintain the model's accuracy; in actuality, the rate changes very slowly.

Remember, we are working with inflation-adjusted numbers. They also stabilize the discount rate. This interest rate is really the market-derived real discount rate, not the market-derived nominal discount rate. The latter rate changes with changes in inflation.

What changes the market-derived real discount rate? The answer is very little. Since the discount rate reflects the value of consumption today versus consumption tomorrow in a noninflation environment, one thing that may alter this rate is a long-term productivity change that makes inflation-adjusted money tomorrow worth more than inflation-adjusted money today.

This would cause the discount rate to increase. Historically, productivity has been steady through the industrial revolution. Other economic drivers of the market-derived discount rate include investor tax rates on capital gains and dividends, and debt leverage for the entire corporate sector.

INFLATION ADJUSTMENTS REVISITED

From the previous sections, you can see how important it is to adjust for inflation. This allows us to match future cash flows with past cash investments in plant, equipment, and working capital,4 and to find the market real discount rate. Placing all risk in cash flows rather than the discount rate allows the discount rate to be pure across the entire universe; this enables us to deal consistently with the time value of

money.

A big question is how do we determine the inflation rate for all these time periods? There are two primary ways to think about it. One is to determine the replacement cost of the assets. The other allows for changes in the purchasing power of the dollar, regardless of replacement cost. We do the latter in our model. We employ the U.S. government gross domestic product deflator for each year as a constant. This provides a consistent view of invested dollars across investments.

For future cash flows, our model generates constant dollar cash flows.

This enables us to match real dollar investment against real dollar cash flows. When incorporating analyst forecasts in our implementation tool, we calculate the implied expected inflation from the difference between U.S. Treasuries and U.S. TIPS (Treasury inflation-protected securities) over a comparable time period. This gives us a good estimate of anticipated 4Technically, the current dollar or constant dollar gross cash investment in operating assets.

inflation rates over a short time frame to match analyst short-range forecasts, the latter typically being between two to five years.

IMPORTANCE OF ACCURACY

We cannot overemphasize the importance of accuracy in calculating intrinsic value. If not accurate historically, our models probably will not predict the future very well. That’s why we provide two types of tracking error for each intrinsic value.

For more information on the importance and utility of tracking errors, please search the index or the text for the importance, utility, and calculation of *tracking errors*.

It is valuable to understand the differences between signed and absolute tracking errors in our models. We provide signed tracking errors, so the user can see if the models tend to consistently over-or undershoot intrinsic values.

Is the intrinsic value line always or nearly always above or below the prices?

If the error is consistently on one side or the other of market price,

you can make an easy adjustment by using a safety factor.[5] The model probably is not catching a specific accounting treatment that is consistent over time. If your strategy is to buy stocks that are undervalued by 30 percent, with a

−5 percent tracking error (intrinsic value is 95 percent of market price), this stock meets your criteria when it is undervalued by 25 percent.

Absolute tracking error is more aligned with estimating levels of intrinsic values, while indicating how inaccurate these numbers may be. This error calculation does not consider the direction of the error. Both over-and undervaluations are treated the same. The signed tracking error does not capture the effect of intrinsic values oscillating both above and below market price. Absolute tracking error does provide a better indication of overall accuracy than the signed tracking error.

The best thing to do is select stocks with negative signed tracking error combined with low absolute tracking error. You can adjust your criterion for the signed tracking error or use it as a safety factor. Your undervaluation criterion must greatly exceed your signed tracking error when the signed tracking error is positive. You also want your undervaluation criterion to greatly exceed the absolute tracking error.

5In fact, this identification process represents an excellent way for security analysts to systematically identify additional data for data vendors to collect to improve the intrinsic valuations.

It is always better to specifically identify the lacking economic information to avoid nasty surprises in unstable intrinsic valuation model results.

We do know from backtesting that low tracking error achieves both superior returns and lower risk. Therefore, you should always have a tracking error constraint when selecting stocks. We suggest that it should be less than 35 percent.

CALCULATING BOUNDED RATIONALITY

(RAWLEY RANGES[6])

One of the first questions “value” investors ask is how do you know when a company is greatly over-or undervalued? Previously, we discussed signed tracking error and absolute tracking error, but we feel we need to go much further. To be more helpful, we have expanded a concept developed by John Bollinger called Bollinger bands.7 The bands seek to estimate a fair price of the stock, using its 200-day moving average, setting a +/− (plus-minus) 1.5

standard error deviation of price around the moving average.

John Bollinger’s research showed that stock price momentum often reversed when it reached these bands. He did not know why, but, when stock price exceeded the 200-day average price by 11 / 2 times the period volatility (standard error deviation), it appeared to be significantly overvalued. This finding occurred irrespective of the time period and industry. This does not happen every time, but it happens enough to make money as an investor.

We felt the 200-day moving average of market price represents a crude proxy for intrinsic value. We also thought we could improve measuring these value inflection points that identify price reversals. Our model of dispersion builds on our research on estimating intrinsic value by relying on the fundamental economic drivers of company size, cash economic return, and trading volume. We use intrinsic value as the foundation or anchor, not a 200-day average of the price. We use market behavior or sentiment, 6Please pardon the name Rawley ranges, but several friends insisted on a new alliteration comparable to Bollinger bands.

7John Bollinger, *Bollinger on Bollinger Bands*, McGraw-Hill, 2002. Efficient market academics have pooh-poohed this type of technical analysis, but behavioral finance has made this discipline more acceptable within the academic community.

In fact, the term *bounded rationality* arises from academic behavioral finance. We suggest that “ranges of bounded rationality” become a core part of the profession’s economic understanding of *in* efficient markets. We should relax the efficient market assumption that price always equals the average intrinsic valuation of all market participants, since many market participants only study price, not fundamental intrinsic valuation.

which causes prices to move up and down around intrinsic value, not

a plus/minus 11 / 2 standard error of prices. We compare market prices with intrinsic value calculated from our expanded cash flow model that includes these fundamental ranges of price behavior.

Thus, our Rawley ranges of bounded rationality in the model are not based on standard error, but on the functions of trading volume, cash economic return, and gross investment. These come together to form a band—

a range of bounded rationality.

Briefly, trading volume represents market behavior. Also, we rank all companies in our universe based on their cash economic return and gross investment size, namely, the cash dollar amount of investments made historically. We discuss them more fully later in this chapter.

We can illustrate our ranges of bounded rationality by using the value chart in Figure 16.5. The bars represent the fiscal year high/low prices. The dark line in the middle exhibits the intrinsic value. The white line on top and gray line on the bottom display the high-low ranges of bounded rationality.

The star in the current year represents the latest price.

As you can see, since the star falls on the lower bound, this stock is an undervalued buy candidate.

Production Ranges

80

80

60

60

40

40

25

25

15

15

10

10

5

5

'98 '99 '00 '01 '02 '03 '04 '05 '06 '07 '08

FIGURE 16.5

Rawley Ranges of Bounded Rationality for

the LCRT Production DCF Model

Our bounded rationality research measures relative dispersion of fiscal year high/low prices through a four-step process. Please pardon the following technical explanation.

1. Divide the fiscal year high price by the fiscal year high value of the S&P

500 index. Also use the same procedure to compute a relative low price for the stock.

2. Take a geometric mean of the relative highs and lows.

3. Measure the dispersion of the stock by dividing the relative high by the geometric mean.

4. Turn that outcome measure into a data point to determine the relationship between dispersion and the fundamental drivers of the company.

We apply the results across all companies to produce ranges of bounded rationality for each firm, as illustrated in Figure 16.5.

Three Fundamental Economic Drivers of Dispersion Affecting Stock Price

Our empirical research shows there are three fundamental drivers that determine dispersions of potential stock prices: stock trading liquidity, company economic performance, and size of the historical cash investments made by the company (used as a company size factor).

Let's explain each. Liquidity is the amount of stock trading volume.

This impacts market behavior toward the company and stock. Are daily volumes high, average, or low? Is the stock being traded actively in high volumes or sparsely in low volumes?

Second, economic performance is measured in cash economic returns.

We rank each company in our universe.

Third, the size factor we use is gross cash investment. It is valuable to know. The model uses gross investment as a size factor because a larger company is simply more stable. Consequently, it generates a narrower range of bounded rationality. Will these assets be productive or a waste of good capital? The band narrows as the company grows and matures. This dispersion model of high/low prices also allows us to gauge the effect of market sentiment on intrinsic value.

In total, Figure 16.5 represents an empirically validated model that combines intrinsic value and market over/underreaction to quantify investor herd behavior from fundamentals, not prices.

To measure the underlying empirical relationships of these fundamental drivers, the dispersion measure is regressed against proprietary nonlinear functions of constant dollar gross investment (size), cash economic

return performance, and trading volume (liquidity). Directionally, all three variables should correlate negatively with dispersion. Thus, as a company grows bigger, achieves higher economic performance, and experiences more trading volume, as an investor you can be more certain about the accuracy of the intrinsic value estimations. You can have more confidence in our model's reading of the true value of the security. And you know where prices are more likely to reverse course.

Please see the section “Managing Risk in Our LCRT Modeling” in Chapter 28 for more discussion and explanation of the ranges of bounded rationality.

So what should an investor do with these ranges (Rawley ranges)?

We discuss this in detail in Chapter 18, “ValuFocus—The Key Tool for Investing in Stocks” and Chapter 19, “Managing Your Stock Portfolio,”

but briefly mention some strategies here.

Rawley ranges are long-term indicators. Stocks can be over-or undervalued for a long time. Thus, they should be used in a long-term trading strategy.

Buy and Hold Strategies

If you are a buy and hold long-term investor who only invests long, you should use these ranges when you rebalance your portfolio. This rebalancing can be every six months, annually, or every two years. You should trim the stocks that are approaching the higher band of rationality in your portfolio by selling some of your positions in these stocks.

You also should add to your positions in stocks at the lower range. You also must consider diversification. With current positions at concentration limits, you can use these ranges to select new stocks, while also considering industry sector diversification in making these selections.

Short-Term Trading Strategies

We have not done extensive testing of Rawley ranges in short-term strategies (days to six months), so we are reluctant to make any recommendations. As we mentioned, a stock price can stay at a higher or lower range for years.

Therefore, any trading strategies should use out-of-the-money puts and calls. We have noticed that stocks rarely move far above or far below these ranges. We add, importantly, that these dynamic ranges move, primarily based on new market information—intrinsic valuations, CER levels, asset levels, trading volume, and S&P 500 high/low indexes. They are not stationary.

Trading Strategies Shorting the Market

In our testing, we have found Rawley ranges to be valuable in enhancing other shorting strategies. Timing is everything when shorting stocks. We would not rely on Rawley ranges as the only timing signal. Our tests show Rawley ranges are effective at enhancing shorting strategies that use other timing mechanisms.

MARKET SENTIMENT AND MICRO AND MACRO

ECONOMIC DRIVERS

We have covered a lot of ground discussing intrinsic value models, but we have not covered directly the issues of market sentiment and micro and macro economic drivers.

Our models deal with how these issues affect the value-creation process.

As a concept created by humans, sentiment and micro and macro economic drivers must be incorporated into the model. Value increases as these drivers become more positive; value decreases as these drivers turn negative. We are tracking the impact of long-term changes in the economic drivers, not short-term noise.

Market Sentiment

As mentioned previously, the LCRT models are calibrated every period to identify key parameters. Because these are parameters market sentiment can impact directly, it is good to sample them often, making changes when necessary. Two primary parameters are the market discount rate and steady-state fade-to rates. Even though discount rates use annual data, they often move slowly for many years. The steady-state fade-to rate uses seven-year GDP

data for calculating both growth and annual cash economic returns. Each changes slowly as market sentiment improves. Over the last 50 years, the discount rate has ranged between 5 percent and 7 percent, while the CER

steady-state fade-to rate has ranged between 6 percent and 9 percent. However, small changes in these rates can have large effects on intrinsic value.

Macro and Micro Economic Drivers

A wide array of macro and micro economic drivers can impact value. Some of the macro drivers we have found important are the following:

- Total market pricing levels (bubbles).
- Leverage levels.

- Monetary policy.
- Tax regimes.
- Inflation risk.
- Fiscal policy.
- Legislation dealing with spending.
- Global competition.
- Tariffs.

Our research shows there are economic cycles. These effects are picked up in the discount rate, inflation adjustments, and in the actual cash flows.

The micro drivers include the following:

- Sales growth.
- Profit margin.
- Sales turns on assets.
- Gross investment.
- Management orientation.
- Company leverage.
- Company size.

All of these drivers are incorporated in the model on a historical basis.

To project these trends, we use a combination of fades. This method

may not be perfect, but we feel it is important to start by working with an unbiased baseline. Our intrinsic value models provide the most likely scenario in an uncertain future.

Please: Our models don't cover such things as the following:

■ News risk.

■ Accounting fraud.

■ Country political risk;

■ Short-range price momentum (Rawley ranges deal with intermediate time periods).

■ Future economic inflection points (recessions, etc.).

■ Future changes in management.

■ Takeover potential.

■ Future acquisitions and divestitures (until new financials are released).

■ Unfunded pension and medical liabilities.

■ Bailout packages to specific industries (until new financials are released).

■ Information not represented in financial releases.

■ Future wars, recessions, terrorist attacks, asset bubbles, and so on.

In the next section, we show you how to include these effects.

IMPROVING THE MODEL WITH YOUR INSIGHTS

AND ANALYST FORECASTING

Our models deliver a highly analytical framework to evaluate past reported economic performance and to determine the most likely value, assuming the world changes slowly. We call this a baseline upon which you can add your own insights. In working with our

model, you have the opportunity to bring vital information and insight. This can be especially valuable when history is not giving you an accurate prediction of the future.

Intrinsic value based solely on historical financial statements constitutes the start of your research. You need extensive research to uncover possible near-term changes. You want to think about what is not being reported.

Enron and General Motors are good examples. In the former case, our model cannot make lemonade out of lemons. Enron accounting knocked our value analysis out of kilter. Without in-depth forensic analysis, we cannot measure off-balance-sheet liabilities hidden in special-purpose entities, or depreciation accruals that extend lives far beyond their time to produce. We do calculate abnormal accruals, but I don't believe they told the whole story with Enron; much of the company's debt was hidden in off-balance-sheet special-purpose entities.

General Motors had large unreported benefit obligations that needed to be assessed in detail and subtracted from intrinsic value. We also would suggest changing the company's debt. As the debt-to-debt capacity ratio increases, value declines significantly. General Motors suffered a significant decline in sales, becoming insolvent, as we discovered in the 2008 subprime recession.

We recommend enhancing the model by incorporating sales and earnings forecasts. Our models provide this opportunity. We incorporate those forecasts into our impulse function of future intrinsic valuations, discounted to present. Incorporating forecasts helps identify economic inflection points.

To wit: Explore the forecasts more deeply when they cause the intrinsic value to drop significantly.

Large changes in sales, profit margins, earnings, and sales turns on assets impact intrinsic value. Also, be cautious when a company acquires or sells substantial assets. These actions can create positive or negative inflection points that will not show up in the model until the company releases new financial information.

In addition, one of the weakest economic areas of accounting is the restated cost of acquired assets to reflect "appraised current value." This tends to throw off intrinsic value. We would prefer pooling accounting based on original historical cost instead of purchase

accounting. Purchase accounting treats the acquired assets as new, thereby misstating the economic life of

the plant and equipment. Accurate economic life calculations are a prerequisite to accurate IRR cash economic returns.8

Our long-term vision: As value investing gains followers, there will be a group of analysts specifically providing their insights using our advanced LCRT research platform. In the meantime, you might want to refer to Section VII to deal with these issues in more detail.

To learn more about adding value to our models by providing sales and earnings forecasts, please study Section V, "How to Make Investment Decisions with ValuFocus."

KEY TAKEAWAYS

1. LCRT models fade both the cash economic return exponentially to a steady-state CER and the sustainable growth rate to the country GDP

real growth rate. These fade functions effectively provide a baseline to enable intrinsic valuation calculations with no analyst interventions.

2. We fade small startup firms with negative CERs toward returns higher than large-firm steady-state CERs, using option pricing functions. Investors purchase these startups as options, because they expect dramatically high future CERs.

3. Unlike traditional approaches to debt leverage, which increase the discount rate, LCRT applies deadweight costs of financial distress to the intrinsic valuations before leverage adjustments. This certainty equivalent of cash flows approach avoids the circular reasoning problem of having equity price in both the discount rate and the valuation.

4. LCRT sets the investor's real discount rate each year in a way that causes 50 percent of the firms in the universe to be undervalued and 50

percent to be overvalued. We can do this approach because all risk is modeled in the certainty-equivalent cash flows.

5. We calculate model accuracy with absolute tracking errors between price and intrinsic value. Signed tracking errors rely on geometric

means between price and intrinsic valuation. More accurate and more unbiased models better predict future price movements with lower risk.

8While we are on the subject, here is a note to stimulate accounting professionals. If and when the accounting principle changes to match gross cash flow (net income + depreciation) to gross assets (assets − nondebt liabilities + accumulated depreciation + inflation adjustment), we are better off. Instead of matching expenses to revenue to produce periodic net income, we then can separate the accounting necessary to calculate IRR cash economic returns on operating assets from acquisition accounting. Acquisition accounting erroneously mixes valuation with economic performance measurement.

6. Ranges of bounded rationality, similar to Bollinger bands, improve the predictive investment process by modeling price dispersions around intrinsic valuation as the anchors. Unlike Bollinger bands, which rely on standard errors of prices, LCRT's ranges of bounded rationality are based on the economic fundamentals of size, cash economic return, and trading volume.

7. Refinements can make the models even better.

■ Begin with a macro model of under/overvaluation.

■ Use data back to the 1950s to incorporate all regime changes, inflation, investor tax rate changes, economic growth rate, and other drivers to produce macro models.

■ Incorporate an expanded XBRL chart of accounts.

■ Extend backtesting to longer than five years.

■ Extend from annual to quarterly data and more timely frequency.

■ Be totally global.

■ Ensure that the best analysts are participating in the process.

■ Incorporate new driver variables into the models.

Putting Our Valuation Proposition

into Perspective

Asummary of the entire proposition should help you form a perspective to convince you to follow our approach and give you the basis to do so.

1. Wide acceptance of the discounted cash flow (DCF) model has produced complacency. For years now, the model has held its place in the stock investing world. It is used nearly exclusively by a relatively small percentage of the universe. It is used widely only as tiny part of a multifactor approach. It is rejected outright by those who love earnings or indexing.

Also rejecting DCF are those who mainly trade daily on market behavior or sentiment. As a result, its usage has stagnated, with little work done to overcome the model's flaws.

2. However, the LCRT research platform thrusts the economic, cash-based stock investing methodology forward, providing a way to empirically test for reasonableness. Right here we need to emphasize the importance of this reality. We must convince you of the reasonableness of the model to get you to use it—to replace whatever method you are using now, or, if you have been shying away from stocks, to persuade you that you can invest successfully in stocks by applying our platform.

3. Different analysts using DCF can honestly arrive at significantly divergent company values. That truth certainly has been evident in the market, forever. It is in most investors' best interests to tighten the market, reduce the volatile swings that characterize it today, by having a widely adopted process that does a better job of determining companies'

intrinsic values.

4. Most investors employ a multiperiod model. Or, they use the capitalization method, which also discounts future economic benefits. While in theory each should return the same values, in reality, they don't.

The reason: It can be difficult to obtain a reliable estimate of long-term growth when it varies from short to intermediate growth.

5. In modeling to calculate an economic benefit and return, most

investors prefer to use net free cash flow, discounted to net present value. At issue is reliability, since most models incorporate 20 or more assumptions, 145

which are built more from investors' professional judgment than factual data.

6. Our approach is built on a baseline intrinsic value model that provides an empirical way to evaluate the reasonableness of discounted cash flow output. We use a value chart extended from the work of Value Line to visually portray a company's valuation. We believe the value chart serves as a powerful research tool to assess the accuracy of valuation models and establish empirically validated baselines.

7. Traditional valuation methods typically use industry as the primary screen to compare companies. We focus strictly on the economics of a company. Our key measure is the cash economic return (CER) of the whole company.

8. Importantly, our model makes adjustments to the conventional measure of net free cash flow. We use fading growth rates to drive asset levels and apply fading cash economic returns to those assets to drive gross cash flows. The formula simply is net income + depreciation.

9. We substitute fade for discrete forecast periods to normalize structure and cash flow over time. A key here is our use of a single-period model. It allows extensive empirical testing of several models applied to thousands of companies over a decade. It is automated with *zero* analyst intervention.

We cannot emphasize this reality too much. Fade is the single most important tool enabling the investor to use a capitalization model instead of a multiperiod forecasting model.

10. We use the universe of public stocks to arrive at the same real discount rate for all companies. We see no value in building up the discount rate or adjusting it for unique risk. Our proprietary fade and other adjustments place traditional risk into certainty-equivalent cash flow forecasts built into the model.

11. A company's value chart compares annual spot intrinsic value for the three or more capitalization models. Tracking errors measure the accuracy of the models. A chart comparing the cumulative percentage of companies against the absolute value of the tracking error effectively compares the accuracy of several models across a large sampling of companies.

Section

Five

How to Make

Investment Decisions

with ValuFocus

Section V describes how to use ValuFocus to achieve higher returns with lower fat-tailed risk.

Chapter 20: Advanced Portfolio Concepts

Chapter 21: What If You Don't Want to Employ ValuFocus Chapter 22: Always Going Forward

Chapter 23: It Is Time to Get Started

Chapter 18: ValuFocus—The Key Tool for Investing in Stocks 1. Importantly, ValuFocus simplifies the investing process. To avoid the complexity that turns people off, LCRT hides all the automated discounted cash flow calculations "under the hood." In this volatile market, accurately valuing a company becomes the critical advantage.

2. For multiple intrinsic valuation models, ValuFocus contains an incredible amount of valuable displays.

■ Charts with model intrinsic valuations juxtaposed against fiscal year high/low prices, along with prices at fiscal year plus three months and current price.

■ Tables with intrinsic valuation and under/overvaluation.

■ Space to enter your own sales and EPS estimates for future intrinsic valuations, translated to compare against today's price. These estimates customize the valuations from your wise insights into the competitive conditions of the firm within its industry.

■ Relative wealth charts with the LCRT models' primary drivers: cash economic return, growth rates, and cumulative wealth created for investors.

■ To identify price inflection points, Rawley ranges of bounded rationality offer a conceptually sound method for you to increase your investment portfolio performance.

■ Tables that summarize under/overvaluation results for each industry or sector.

■ Tables summarizing the accuracy of each model covered. Recall

that more accurate models are more predictive to help you achieve higher returns at lower risk.

■ Analyzing pairs of competing companies, like Coke and Pepsi, to help understand outliers. Importantly, analyzing outliers by security analysts should provide insights into supplemental information that data providers should collect and modelers should incorporate to reduce bias, increase accuracy, and therefore predictive capability.

Improved predictive capability gives you an information advantage over others in the market. Less informed traders and investors are the people with whom you want to conduct transactions.

■ Strategic variables constitute a set of variables worthy of inclusion.1

■ Value charts illustrate the huge importance of fade (academic "regression toward the mean") in the cash economic return and system growth rate. Zero fade rates produce incredibly high and unrealistic intrinsic valuation for Hewlett-Packard. Fade enables the models to transform a traditional multiperiod, security-analyst DCF forecast into a single-period model. A single-period model enables empirical testing for robustness, nonbias, accuracy, and predictive capability purely on historical data without analyst intervention.

3. Setting the single market-derived discount rate each year to its associated long-term country economy growth rate represents a critical 1Robert D. Buzzell and Bradley T. Gale, *The PIMS (Profit Impact of Market Strategy) Principles: Linking Strategy to Performance* (Free Press, 1987).

Please see also Alfred Rappaport, *Creating Shareholder Value: The New Standard for Business Performance,* Macmillan/Free Press, 1986; and *Creating Shareholder Value: A Guide for Managers and Investors* (Simon & Schuster/Free Press, 1998).

model parameterization step. Ideally and eventually, the growth rate for each country will be based on extensive empirical evidence by the Federal Reserve, rating agencies, and others on its relationships with tax structures, tax rates, monetary policy, fiscal policy, and freedom-related microeconomic structures, such as property rights.

Chapter 19: Managing Your Stock Portfolio

1. You should have a diversified portfolio of a number of stocks. Diversification protects you from one stock taking a dive. "Don't place all your eggs in one basket."

2. Whether that number of stocks is 20 or 100 or 500 is up to you. We do not recommend three to five stocks, because the number is overly subject to one or two torpedoes, from which you can never recover.

3. Twenty stocks enables you to focus on a lower number to apply your unique insights. While theoretically suggested by Eugene Fama, 100 stocks in your portfolio may be too many for you to follow. And Fama never incorporated intrinsic valuation into his research, much less the automated variety described in *ValuFocus Investing* to reduce Benoit Mandelbrot's stable Paretian alpha peakedness risk.

4. Eventually, we intend to extend ValuFocus to portfolio construction and trading. LCRT will base this extension on empirical validation, as we have always done. It will replace traditional mean-variance.

5. The ValuFocus portfolio construction extension will suggest stocks to add or subtract from your portfolio based on achieving a balance across all key economic dimensions of intrinsic valuation—size, cash economic return, growth, financial leverage, asset life, asset mix, industry, sector, and so on. It also will suggest when to trade relative to the release of new information and when to rebalance your portfolio.

Chapter 20: Advanced Portfolio Concepts

1. Buy stocks that are 35 percent undervalued and have a signed tracking error of less than +/− 15 percent and an absolute tracking error of 10 percent or less.

2. Diversify across industries, usually holding less than 5 percent in any one company.

3. Use your insightful forecasts to identify company inflection points based on future cash economic returns improvement.

4. With the economic meltdown, simple buy and hold strategies are under severe questioning. Only more active investing likely will conserve and increase retirement savings.

5. Depending on psychological sentiment for the entire market, adjust your mix among cash, bonds, and stock.

6. Employ equal weighting or intrinsic value weighting instead of CAP

weighting.

7. Consider purchasing call options from the tail of most undervalued stocks and purchasing put options from the tail of most overvalued stocks. Fund these option purchases from the middle part of the under/overvaluation distribution by selling or writing covered puts and calls.

8. Selling short is a good strategy, but requires more in-depth knowledge of the firm and close analysis of market sentiment to get the timing right.

9. This "cash generator" strategy extends the use of puts and calls to buy lower and sell higher. It also requires extensive use of market sentiment and technical indicators.

Chapter 21: What If You Don't Want to Employ ValuFocus This chapter suggests downloading a copy of the Excel software from the LCRT web site in order to learn firsthand how to construct an automated intrinsic valuation model. Then, you can learn how best to

test the model against historical data with the measurement principles of robustness, accuracy, nonbias, and predictive capability.

Chapter 22: Always Going Forward

1. Policy changes, especially with Social Security, strongly encourage individuals to undertake much greater responsibility for their savings and investments.

2. *ValuFocus Investing* provides the framework and ValuFocus delivers the tools to actively accept this greater responsibility to manage your savings and investments.

3. Eventually, we plan to incorporate analysts' insightful forecasts from industry competitive analysis on top of LCRT's ValuFocus intrinsic valuations to give you one more information advantage against less knowledgeable investors and traders. Our continuing research into a new price formation process will cover analyst research, bounded rationality to cover risk, and multifactors to cover the noise.

4. We would love to incorporate your insights from using ValuFocus into the LCRT cash-based economic framework.

Chapter 23: It Is Time to Get Started suggests that we can change traditional practice through YOU—one investor at a time.

CHAPTER 18

ValuFocus — The Key Tool for

Investing in Stocks

N *ote.* LCRT is working with the brokerage industry to make ValuFocus available to investors. Please check our web site at www.ValuFocus.com

for a list of available brokers or check with your broker to determine if it is offering ValuFocus. Access to ValuFocus also is available on our web site,

www.ValuFocus.com.

Also, check with your local library. We want to encourage local libraries to carry both *ValuFocus Investing* and an on-line, scaled-down version of ValuFocus capability that you can play with.

The importance of ValuFocus: It simplifies the investing process.

Complexity is what turns people off. We hide the complexity under the hood.

In this volatile market, accurately valuing a company becomes the critical advantage.

Hopefully, by now, we have convinced you that the foundation of investing in stocks is an accurate estimation of the value of the business, namely, its intrinsic value.

We use a comprehensive process of determining a company's real intrinsic value as the basis for knowing if the equity market at present is over-, under-, or fairly pricing the stock. Knowing that the market migrates toward intrinsic value, we buy shares when they are being underpriced, sell any overpriced holdings, and make sure management is able to continue growing value when the stock is being priced fairly.

Importantly, we look for inflection points that will cause the market to recognize underpricing and start buying shares or overpricing and start selling them. The earlier we can identify these sure-to-be inflection points, the more we gain by starting to buy shares or the more we lock in our already-won gains by selling shares before the market catches on to the overvaluation. Inflection points can be:

- Company specific, such as smart operational, management, or financial moves.

- Driven by industry or sector factors.

- Macro economic, political, or other factors.

What matters is our ability to recognize confidently in advance that these major actions are going to impact the intrinsic value and stock price of this particular company.

Working with a model that accurately estimates intrinsic value is the vital first step. It forms the fair price. That's why we see our model driving the price formation process.

Our LCRT model becomes the tool to determine if you should buy, sell, or hold a certain stock based on knowing the company's intrinsic value. We call the model, or tool, ValuFocus.

Our purpose in this chapter is to teach you how to use ValuFocus to select stocks to buy, hold, and sell in managing your equity portfolio. ValuFocus gives you accurate estimates of intrinsic value. It does so by applying the model's automated DCF calculation, plus the impact of such vital drivers as analyst research, market behavior or sentiment, and others. Importantly, it also enables you to add critical inputs from your own research, analysis, and judgment, if you choose. If you possess an information advantage, you can use it fully with our model.

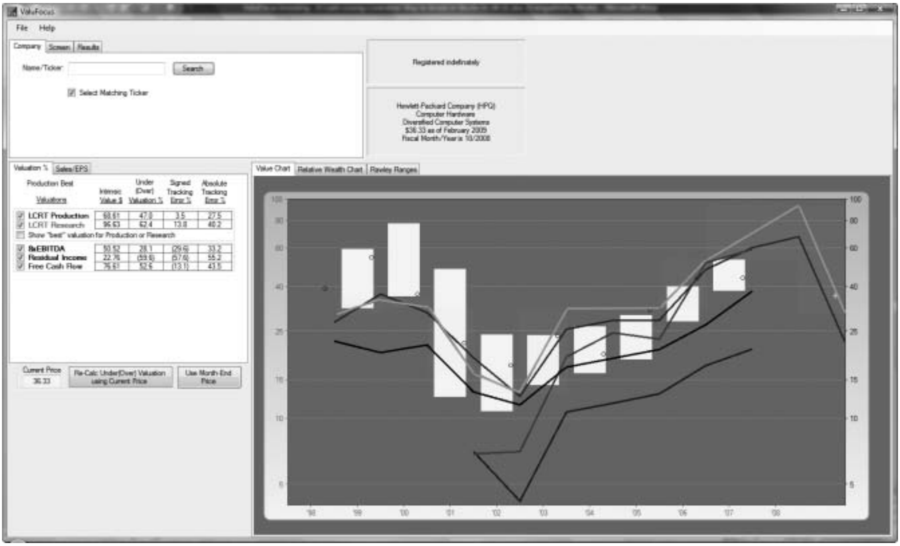
We truly believe that adopting a cash-loving contrarian view toward stock and bond investing and then using ValuFocus as your principal tool for managing your equity portfolio constitutes an innovative process. Your timing is right. The trend is clear: Individuals increasingly are taking over responsibility for managing their money—for a better life now, to prepare for enjoying retirement fully.[1]

Equipped with that best estimate of intrinsic value based on the empirically validated results of the automated DCF model and other viable inputs, you can buy the stocks that are underpriced and sell any in your portfolio that are overpriced.

Your goal, of course, is to outperform the market, but even more so, to achieve superior returns on your investments with lower risk than indexed fund strategies.

We are assuming that you are a serious stock investor. Or that you are investigating whether you want to be. Or you may become one if we can convince you that what you have here is an effective way to select stocks.

1Many economists recognize that both Social Security and many company pension benefits are unsustainable vehicles for retirement savings in their current form over the long term. Consequently, individuals will need to undertake more responsibility for their own investing. Some will choose to "buy the market" with low-cost indexed and exchange-traded funds. Those who agree with the research extensively described in this book recognize that an indexed strategy just may produce more risk with lower return.



ValuFocus—The Key Tool for Investing in Stock

153

As a serious or want-to-be serious investor, you are focused on valuation, not day trading. You are also good at being analytical. Analysis through the model is fundamental in this stock price formation process. You will use a set of analytics in your decision making. You also are inclined to be disciplined and not compulsive. Fit the personality? Good. Or close enough. Let's go to work.

THE COMPONENTS OF VALUFOCUS

We are demonstrating ValuFocus, and the best way to do it is to work with screen shots. We have selected companies that are well known. We employ a period of time in early 2009. This is a book meant to be fairly timeless, not a computer with its inherent timeliness. These demonstrations are aimed to be useful to you whenever you decide to work with them. You can apply the model in making investment decisions today, tomorrow, or some other time in the future.

We start by looking at the ValuFocus dashboard in Figure 18.1. It contains an incredible amount of information and gives us the flexibility to include our input based on additional research and our own judgment. We will blow up each section of the screen shot for easier viewing.

FIGURE 18.1

ValuFocus Company Screen Shot

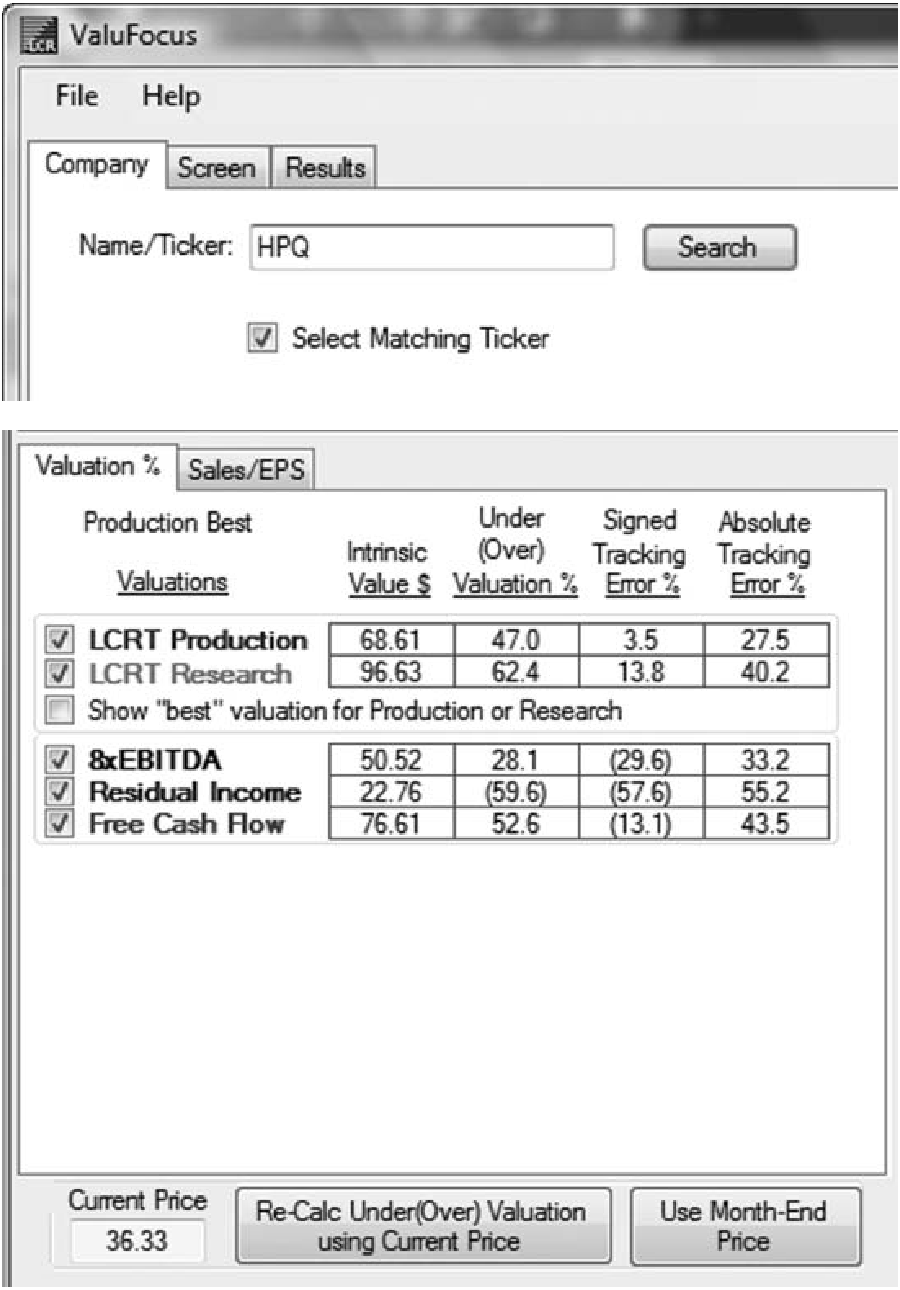


FIGURE 18.2

Search Name/Ticker

FIGURE 18.3

HPQ Model Valuations and Tracking Errors

We start by typing in the ticker symbol of the company we want to study on the "company" tab displayed in Figure 18.2. Try HPQ and click on "Select Matching Ticker."

First, we want to look at the Valuation tab in Figure 18.3. Intrinsic value calculations are provided for five different models—our LCRT production

and research models, 8xEBITDA, residual income, and free cash flow versions. The current price of the stock is shown, enabling us to compare each model's estimation of intrinsic value against market price. We also learn the percentage of over-and undervaluation at the moment.

Importantly, this same section blown up in Figure 18.3 gives us the extent of the accuracy of the over-or undervaluation of each model.

Percentages portray accuracy through two methods—signed and absolute tracking errors. Please search the index or the text for the importance, utility, and calculation of *tracking errors*. These readings enable us to decide which model is likely to be best to work with in valuing this particular company, based on our proprietary ability to indicate levels of accuracy in relating our estimates of intrinsic value to actual stock price. The chart even tells us which model is best for a company, just in case we don't trust our judgment. Our ways to build tracking error calculations and compare them with intrinsic value and stock price are described fully later in this chapter.

Our last chapter provided important empirical evidence that more accurate models produce better investment returns with lower risk.

These superior performance levels of risk and return show why we devote so much time to quantifying each model's accuracy. We provide that model accuracy to you so you can judge for yourself how each model compares along the accuracy dimension.

All these models rely solely on historical financial information without analyst intervention or forecasts. Using solely historical information

enables us to separate the value-added of the star analyst input, plus yours.

In studying a company, the chart illustrated in both Figure 18.1 and Figure 18.4 is loaded with vital information. It encompasses three key analytical studies—the value chart, the relative wealth chart, and readings of degree of risk shown through Rawley ranges. Covering 10 years, dating from 1998 in these cases, the charts track stock prices annually against a company's key economic performance indicators and intrinsic values to show over/underpricing. These comparisons cover all five model versions comprising our master model.

Let us look closely at the value chart in Figure 18.4. The white rectangles show the high-to-low range of actual prices on an annual basis with the circle inside indicating the closing price at the end of the year. Those white rectangular pillars also represent each year. The numbers running up the side of the charts are the stock prices and the numbers running across the bottom of the charts are the years. The labeled lines represent each of the five model versions—the research model, the production model, the EBITDA version, the residual income model, and the free cash flow model. You can choose the models to see and compare readings and results—from one to all five. Our tendency is to compare the production and research models

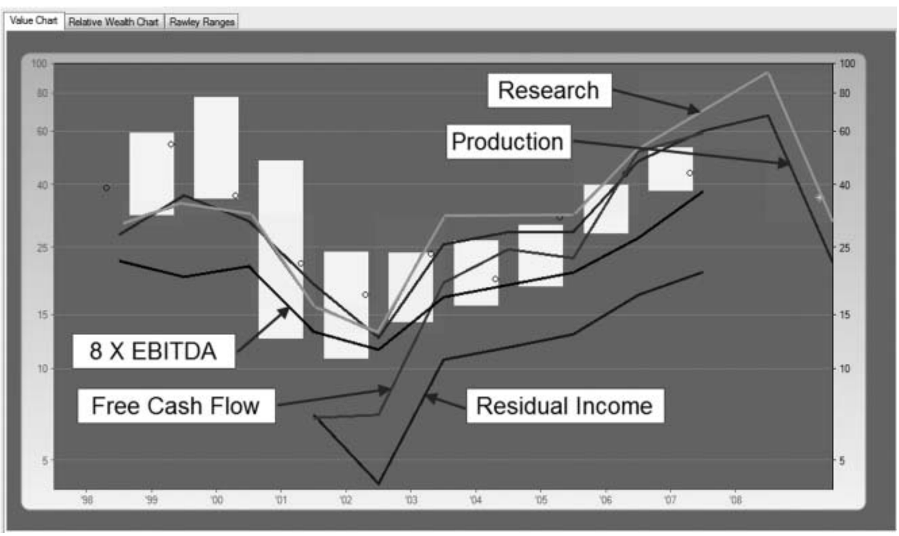


FIGURE 18.4

since we believe they produce the most accurate findings in predicting future price movement.

THE RELATIVE WEALTH CHART: CASH ECONOMIC

RETURN, GROWTH, AND STOCK PERFORMANCE

We have a way to go in showing you all that you can do to benefit from using ValuFocus. Next is the relative wealth chart in Figure 18.5. Again, we are covering 10 years, dating to 1997. The chart has three sections. The top panel tracks the cash economic return, shown in the dark pillars for each year, against the discount rate, indicated by the black line extending across each pillar covering the 10 years. You can use this chart to track cash economic return (CER) against the discount rate. CER will be at, above, or below the discount rate. The chart will show the CER to be flat, growing, or shrinking.

Cash economic return is a major, significant value driver. We want to stress its importance in valuing a company.

Let's follow the logic. You can readily see that when a company's cash economic return is high, growing assets raises value. Capital spending to grow high-returning assets increases value. A company can shrink assets and still have high cash economic returns on its remaining assets. When the

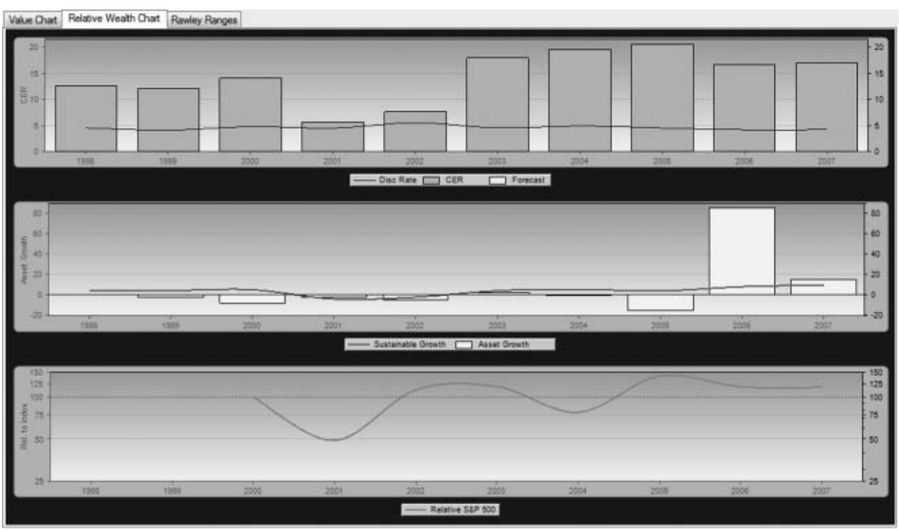


FIGURE 18.5

Relative Wealth Chart

company shrinks assets and the CER falls, it would appear that management is getting rid of its higher-performing assets. When the company increases assets and its CER falls, it isn't adding high-performance assets. It likely is destroying value. And when assets don't grow and the CER falls, clearly the company is destroying value. It certainly isn't creating value.

Figure 18.5 shows the performance history of Hewlett-Packard's cash economic returns. HPQ grew its asset base in 2006 and maintained a quite healthy CER—sitting at 17 percent. That is a real good return on assets.

The new CEO has a strong operational background; we would expect the company to grow newly acquired assets at a CER level to 20 percent.

To summarize: We are showing the primary driver of intrinsic valuation, namely, the CER, and our discount rate for calculating the present value of cash flows. To create shareholder value, the CER must be above the investors' required return or discount rate.[2]

[2]One important exception exists for the principle that CER must be above the discount rate to create shareholder value on new investments: startups. In startups, the CER has not reached a level of maturity to reflect long-term profitability. Recall that we utilize option functions to reflect the market's expectations for much higher than average CER for startups.

To our knowledge, no one else has empirically validated such an automated option approach for startups.

The second panel in Figure 18.5 displays the actual gross asset growth rate (white pillars) compared against the sustainable growth rate line. For HPQ, that rate is rising. Sustainable growth rate is a vital parameter in our models to indicate a company's ability to create value. Is it being sustained, rising, or falling over time? A rising

sustainable growth rate shows that a company is creating value when the CER exceeds the discount rate.

Of course, our models also function to fade that sustainable growth rate, as indicated in our discussion before. That rate can fade down or up, based on the various factors that come into play. That's where you put on your research/analyst hat and do your good homework.

The fading sustainable growth rate is the key measure in determining long-term value.

You will see in our charting of Hewlett-Packard that asset growth was flat for years and then grew substantially in 2006 with the acquisition of Compaq. Acquisitions, of course, are just one way to grow assets.

There is one more chart to study, the bottom panel in Figure 18.5. It shows price performance (not return performance) relative to the S&P 500

index, including dividends, on a per-share basis. It reveals the company's price performance in relationship to that of the S&P 500, covering a 10-year period. You can see how the stock you are studying performed against the index on an under-and overperformance basis; how often and for how long has it under-and overperformed the index? That is valuable information.

Covering a decade, it offers good clues on how the company will fare in the future, compared against the index commonly viewed as replicating market performance.

RAWLEY RANGES OF BOUNDED RATIONALITY

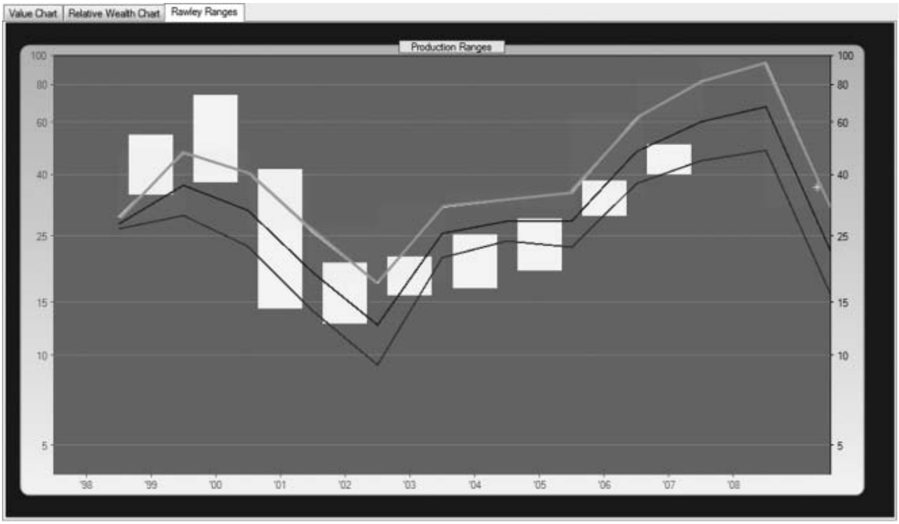
Our value charts include Rawley ranges, indicating the ranges of bounded rationality in computing the dispersion of prices around the intrinsic value of the company through the 10-year period. The white pillars in Figure 18.6

show the intrinsic value range for the year. Please refer to the index or search on *ranges of bounded rationality* to understand the concept and calculations.

Prices tend to reach inflection points and reverse their momentum when they approach these boundaries.

To our knowledge, no one has modeled ranges of bounded rationality to determine price inflection points from fundamental drivers. Our

fundamental economic drivers of our model for the dispersion of fiscal year high/low prices are size, cash economic return, and trading volume. The greater the size, the higher the CER, and the higher the trading volume, the



ValuFocus—The Key Tool for Investing in Stock

FIGURE 18.6

Rawley Ranges of Bounded Rationality

narrower are the ranges of bounded rationality. Being “narrower” means prices are less dispersed.

These ranges of bounded rationality become exceptionally useful in executing investment strategies while reducing fat-tailed risk.

EPS AND SALES OVERRIDES

We can look at forecasts of the company’s revenues and earnings per share going forward. Figure 18.7 and Figure 18.8 contain an extrapolation with no overrides. To get at these predictions, you can choose the source of forecasting you trust the most. The model recalculates intrinsic value and under/overvaluation, using the current price or month-end price, based on the added research and judgment that you and your sources bring to the process. Figure 18.9 and Figure 18.10 contain a $.25 override. In 2008, the market wasn’t expecting much for 2010. However, the discount rate rose dramatically with the

uncertainty caused by the meltdown.

We can look at the industries within a sector and the companies within an industry. We can identify the sector and industry of each company we choose to analyze.

Figure 18.11 from the Results tab compares companies within an industry for purposes of selecting one, making a change, or adding or subtracting one, consistent with our desire to hold *X* number of stocks

Valuation % | Sales/EPS

	2008	2009		2010	
	Year	Base	Override	Base	Override
Sales $M:	118.36	127.22		136.74	
Sales Growth Rate %:	7.49				
Consensus EPS:	3.25	3.49		3.75	
EPS Growth Rate %:	7.49				
Non-Earnings Margin %:	.799	.799	.799	.799	.799
Capital Turnover X:	2.345	2.345	2.345	2.345	2.345
Cash Economic Return (CER):	18.80	18.39		18.38	
Production					
High $:	103.2	94.4	na	97.9	na
Intrinsic Value $:	73.76	67.47		69.98	
Low $:	52.7	48.2	na	50.0	na
High %:	64.8	61.5	na	62.9	na
Under (Over) Valuation %:	50.7	46.2	na	48.1	na
Low %:	31.1	24.6	na	27.3	na

View Research Results

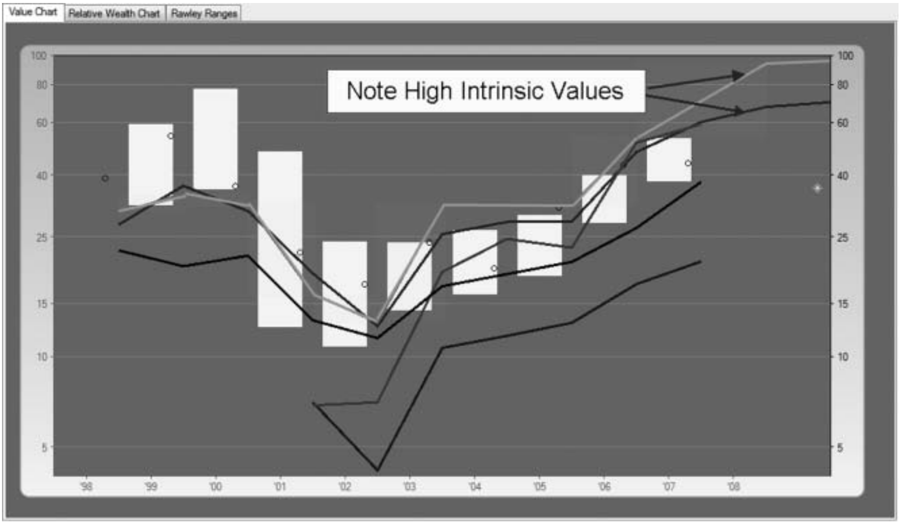
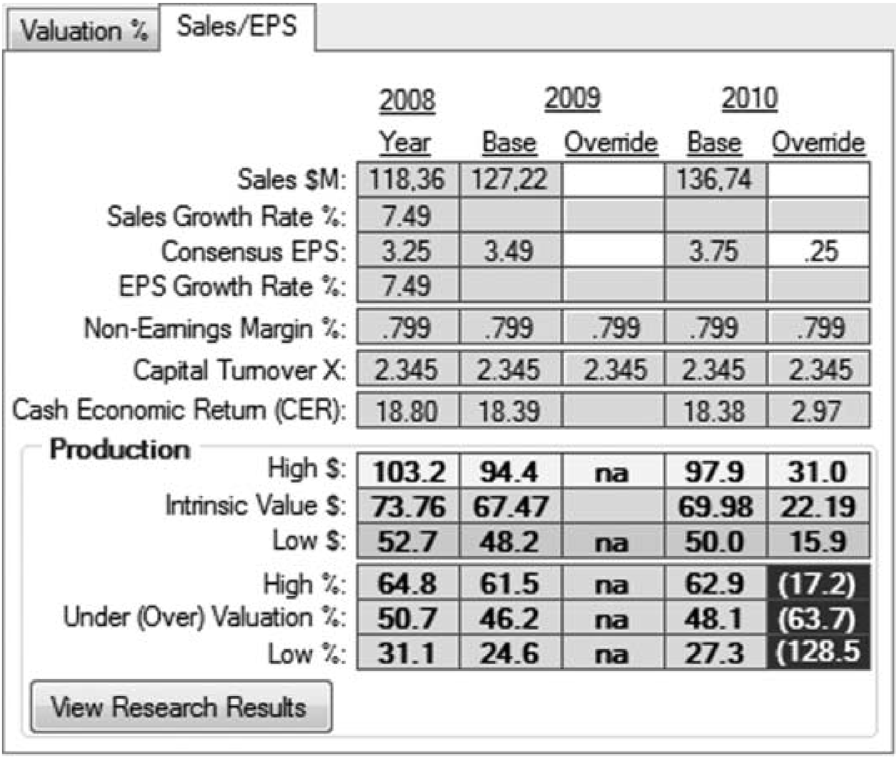


FIGURE 18.7

Forecast Assumptions and Intrinsic Valuations

FIGURE 18.8

No EPS Override



	2008 Year	2009 Base	2009 Override	2010 Base	2010 Override
Sales $M:	118.36	127.22		136.74	
Sales Growth Rate %:	7.49				
Consensus EPS:	3.25	3.49		3.75	.25
EPS Growth Rate %:	7.49				
Non-Earnings Margin %:	.799	.799	.799	.799	.799
Capital Turnover X:	2.345	2.345	2.345	2.345	2.345
Cash Economic Return (CER):	18.80	18.39		18.38	2.97
Production High $:	103.2	94.4	na	97.9	31.0
Intrinsic Value $:	73.76	67.47		69.98	22.19
Low $:	52.7	48.2	na	50.0	15.9
High %:	64.8	61.5	na	62.9	(17.2)
Under (Over) Valuation %:	50.7	46.2	na	48.1	(63.7)
Low %:	31.1	24.6	na	27.3	(128.5

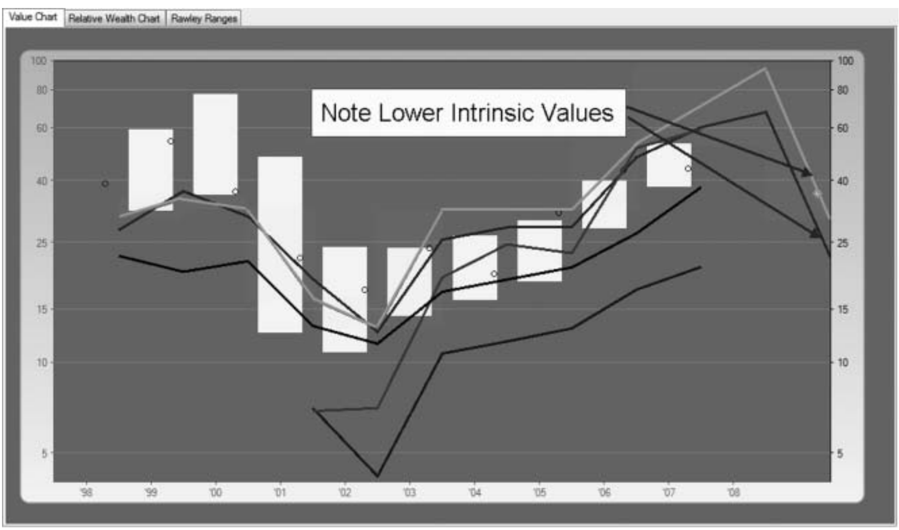


FIGURE 18.9

Forecast Intrinsic Valuations with $0.25 EPS Override FIGURE 18.10

$0.25 EPS Override in 2010

Company | Screen | Results

Company	Ticker	Price	Intrinsic Value	Under(Over)	Seq
Sun Microsystems, Incorporated	JAVA	5.76	17.26	66.6	1
International Game Technology	IGT	10.98	22.67	51.6	2
Hewlett-Packard Company	HPQ	36.33	68.61	47.1	3
International Business Machines Corporatio	IBM	96.82	123.62	21.7	4
Scientific Games Corporation	SGMS	14.53	16.65	12.8	5
Netezza Corporation	NZ	6.24	3.87	-61.2	6

FIGURE 18.11

Table of Results for an Industry

in maintaining a diversified portfolio. The chart identifies each company, its ticker symbol, stock price, intrinsic value estimation, and over-and undervaluations based on the tracking errors. Companies are ranked from most under-to the most overvalued. Data and findings cover all five model versions in our system.

ValuFocus enables us to run scenarios in making forecasts of various drivers of value—revenues, EPS, growth rates, nonearnings margins, capital turnovers, cash economic returns. We put in numbers from outside sources or our own judgments to arrive at new forecasts of sales, EPS and their growth rate, ranges of intrinsic value, and over/undervaluations. These analyses can be performed with the LCRT production and research models.

In sum, ValuFocus enables us to screen for stocks to buy and sell. This tool can be used to screen up to the 7,000 stocks in our U.S. universe by sector, by industry, or by going directly to the company. ValuFocus serves as both a stock picker and portfolio manager.

ANALYZING HEWLETT-PACKARD

Our first company to study is Hewlett-Packard. We put in the ticker symbol, HPQ. Right away, Figure 18.12 identifies the sector, which is computer hardware, and the industry, namely, diversified computer systems. Its last Hewlett-Packard Company (HPQ)

Computer Hardware

Diversified Computer Systems

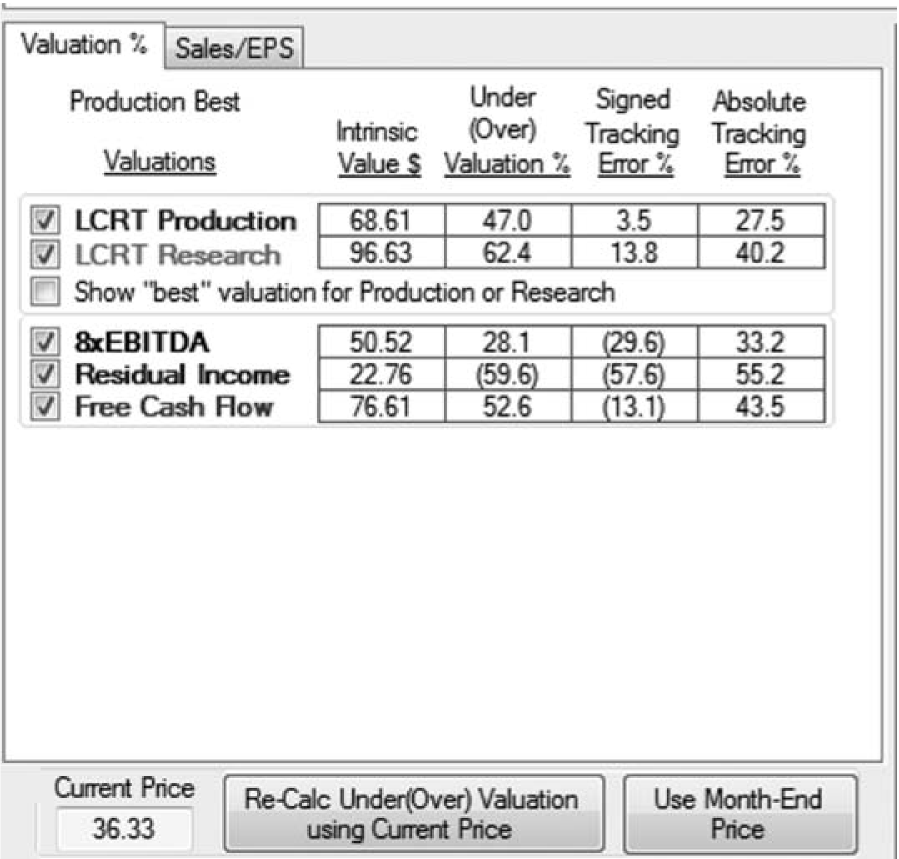
$36.33 as of February 2009

Fiscal Month/Year is 10/2008

FIGURE 18.12

Company

Information for Hewlett Packard


Valuation % | Sales/EPS

Production Best Valuations	Intrinsic Value $	Under (Over) Valuation %	Signed Tracking Error %	Absolute Tracking Error %
LCRT Production	68.61	47.0	3.5	27.5
LCRT Research	96.63	62.4	13.8	40.2
Show "best" valuation for Production or Research				
8xEBITDA	50.52	28.1	(29.6)	33.2
Residual Income	22.76	(59.6)	(57.6)	55.2
Free Cash Flow	76.61	52.6	(13.1)	43.5

Current Price 36.33 | Re-Calc Under(Over) Valuation using Current Price | Use Month-End Price

fiscal year for purposes of this study closed in February 2009 at a stock price of $36.33 a share.

As we start to build a portfolio, we likely allocate the number of companies to own in any given sector and industry. Using our model,

we value each company, comparing the intrinsic value estimate with its current market price. Our model incorporates released accounting data based on companies' fiscal year.

Prime in our decision making is the Valuation tab. As we indicated, the LCRT model gives us five valuation models to choose from and work with. There probably are about 20–30 valuation models being deployed by investors market-wide today. We have chosen five that we believe offer the best opportunity to value companies accurately.

We work with these five: the LCRT production model, LCRT research model, free cash flow model, residual income model, and 8x (times) EBITDA (earnings before interest, taxes, depreciation, and amortization) version. You can see them on the screen in Figure 18.13.

As an investor, you can work each model for each company you are studying to see which model does the best job of valuing the particular FIGURE 18.13

HPQ Model Valuations and Tracking Errors

company. Using the same parameters with all five models enables determining which models are most accurate in estimating intrinsic values and predicting changes for the company, and which models don't work as well.

You want to pick the model doing the best job of valuing the company you are studying.

Each model indicates the intrinsic value calculation of HPQ, identified as price per share. In a very real sense, that price is revealing characteristics of the model itself. At this time, the LCRT production model has an intrinsic value of $68.61 per share for HP, while the research model estimates an intrinsic value of $96.63 a share.

There are differences. The production version is more of a classic DCF

model, with the risk contained in the denominator, namely, the discount rate. That is the more classic view. In contrast, the research version is more advanced. It incorporates the risk in the numerator, namely in the cash flows.

The research model also has built-in "optionality," allowing more sophisticated actions, such as projecting potential changes in the business and their values. In reality, a company could over-or underperform its history. That's why we call it the research model; it adds research.

Our extensive analysis of historical price movements of companies makes it clear that an options function is highly beneficial to investors. Our studies show considerable variability in cash flows historically, prompting us to build in the capability of applying some probability analysis when estimating cash flows in the future. Two important situations apply in extending the capability to value companies: those with no cash flow at the time that still have value; and those with erratic cash flows.

In Figure 18.13 you can see the estimated intrinsic values as calculated by the five models, and the extent to which these values differ from actual market prices, indicated by percentages of over-and undervaluation.

The 8xEBITDA and residual income models show the lowest intrinsic values and high levels of overvaluation.

The LCRT production and research models and the free cash flow model indicate higher intrinsic values and varying levels of undervaluation.

These are opposite valuations.

These results also demonstrate how diverse the range of intrinsic valuations can be, based on the model chosen.

DETERMINING THE ACCURACY OF THE VALUE

CALCULATIONS

The next question is: How accurate are these estimates? For this determination, we turn to calculating and analyzing tracking errors. You can see

the signed tracking errors and absolute tracking errors for each of the five models in covering each company. These indicate which models have been more accurate historically in estimating intrinsic values in relationship to market prices. Investors can pick the model shown to

be most accurate for each company. Our formula is intrinsic value less the price over the price in Equation 18.1. Here is the formula:

Equation 18.1 Tracking Error

$$Error_{it} = \frac{IV_{it} - P_{it}}{P_{it}}$$

The model runs two types of errors. The first is the signed tracking error, which represents positive and negative errors. The second is the absolute tracking error, shown in percentages of over-and undervaluation—the extent to which the market currently is under-or overpricing the stock.

(Please search the index or the text for the calculation of *geometric mean tracking errors*.) We are looking to buy stocks that the market is underpricing and sell those in our portfolio being overpriced by the market.

With HPQ, for the signed tracking error, we are being urged to use the production model. It is indicating a positive error of 3.5 versus a positive error of 13.8 for the research version. However, in gauging the usefulness of the absolute tracking error, the production model is indicating a 27.5 percent error, compared with 40.2 percent for the research model. The difference is a value of about $17 a share.

Now we bring in the other three models. The 8xEBITDA estimates an intrinsic value of $50.52 a share with an absolute tracking error of 33.2 percent. The residual income model shows a value of $22.76 a share with a high 55.6 percent tracking error. Intrinsic value of HPQ, according to the free cash flow model, is $76.61, with a lower absolute tracking error of 43.5 percent.

We are not surprised by these findings. The 8xEBITDA and residual income models estimate lower intrinsic values. Accounting-oriented

models typically offer lower values and less accuracy, the latter indicated by the higher levels of tracking errors. Free cash flow models historically give better results.

It is valuable to understand the differences between signed and absolute tracking errors. For signed tracking errors, models tend to consistently over-or undershoot intrinsic values. Is the intrinsic value line always or nearly always above or below the prices? By what amount is what matters!

Some models more often undervalue. Thus, a small signed tracking error, either negative or positive, brings you close to the intrinsic value of the company. This favors the small positive tracking error indicated for HPQ

by the production model. Absolute tracking error is more aligned with estimating actual intrinsic values, while indicating how inaccurate these numbers may be.

As the investor, you likely will be inclined toward the production model in valuing Hewlett-Packard. The tracking error is small when viewing historical prices. It is overvaluing HPQ, but by a small amount. It also shows consistency. Still, the research model is highly useful, especially for investors who have done their homework on HPQ and have been long-time followers of the company. We can understand why the research model is giving HPQ a higher intrinsic value reading.

Indeed, the research model has tended to be more generous in its intrinsic value estimates. By correcting the plant life assumptions some time back, we have found that the two models have moved closer together in their estimates of value.

USING THE VALUE CHART

But in your study leading up to an investment decision, you also will want to use the graphical analysis shown in the value chart in Figure 18.14. Taking advantage of the benefits offered by the value charts clearly constitutes a road less traveled for modelers and investors. The white rectangles show the actual high/low prices of HPQ shares on an annual basis. The pillars represent a year. This chart runs from 1998 through 2007; we cover a 10-year period. The circle is the closing

price at the end of the year, that is, the fiscal year plus three months. We account for the disclosure reporting lag at the end the fiscal year by incorporating the following quarter.

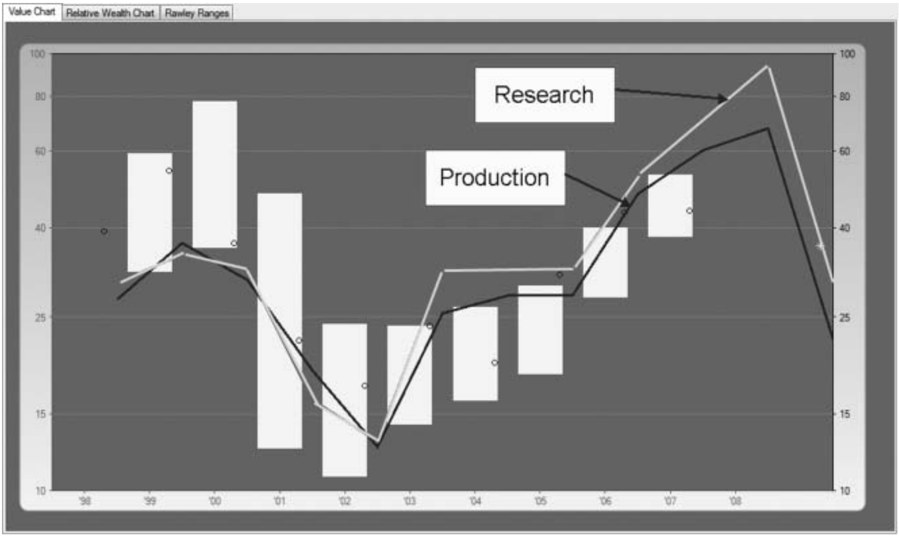
We are going to show you how to optimize the value of this information-laden chart.

A vital feature of any model is its ability to be predictive. The big question: Do the values calculated from the historical cash flows by the model provide any information on the direction of the stock price, critically, before the price starts to move in that direction? This is intuitively important.

If you are going to use the model to make decisions, you need to understand if the model truly has some predictive capabilities and thus is of practical investment use.

We are looking at our chart in Figure 18.4 and are tracing the action of the stock price for the next few years, relating that movement to what was happening to the company, industry, economy, and investor behavior.

Starting from 1999, we can see the value deteriorating substantially, from a value of $37 a share to about $13 a share. The market was reflecting changes in the business, the industry, and learned attitudes of investors and analysts. Put another way: The market was responding to information.



ValuFocus—The Key Tool for Investing in Stock

FIGURE 18.14

HPQ Value Chart

By studying the price range, you can see the great war that was going on. The price reacted to declining economics by dropping steadily.

Some investors believed the company would recover while others saw it continuing to decline. This led to the sizable price dispersion in 1999 and 2000, indicating the considerable controversy among investors trying to predict the company's performance in 2001. The price rose handsomely in 2000, but then came the giant inflection point, namely the bursting of the Internet bubble. Call it a big economic change in direction.

HPQ's stock price was highly volatile in 2001, especially when compared against the previous three years. That performance was typical of the times. Most tech stocks before the bubble were being overvalued, according to our models' calculations of intrinsic values. These were "story" stocks, being carried by tremendous market momentum. Stocks swept up in the momentum can stay overvalued for a long time. When a stock is overvalued, that doesn't mean the price necessarily is going to plunge quickly. Probably a small percentage of investors are aware of the overvaluation at the time.

Most prefer to ride the positive momentum.

EARNINGS RESULTS CAN BE MISLEADING

In these situations, investors are not likely to get any clues suggesting overvaluation from accounting data either. The accounting data most surely

showed HPQ's earnings growing from year to year. But in truth, the company's earnings quality was dropping. We can speculate comfortably that management was making some changes inside in its investments, maintaining a write-off strategy to keep earnings momentum positive.

Earnings are not an indicator of future performance. The market was

overvaluing the stock based on EPS growth.

In 1998 and 1999, earnings per share were rising. EPS projections by the company and sell-side analyst crew were steadily upward. The high-tech image of the time was a revolution in this sector; HPQ would continue to grow nicely at this high rate.

For investors and analysts wanting to look more closely and objectively, there were signs of a bubble. Earnings no longer could sustain the story.

Suddenly, the market had to become realistic. Typically, investors tend to overstate their pessimism. We sure have seen this attitude in spades among investors and the media covering the equity market in 2008 and 2009. Now, let's add 2010.

The attitude toward HPQ was that the company was in trouble.

Compounding its problem was the purchase of Compaq. The issue was out there on whether this was a good or bad acquisition. Will it add value or did HPQ pay too much for Compaq? One thing was clear: The economics of the business were deteriorating.

The stock price fell from $79 a share to $12 in a three-year period. The inflection point began in 1999 when the estimated intrinsic value started to fall. It's all there to be studied in the relative wealth chart.

THE MARKET OFTEN IS SLOW TO REACT TO VALUE

IMPROVEMENTS BY MANAGEMENT

By now we are in 2002 and good change is beginning. Business operations are improving, reflected in a rising stock price. The company has a new CEO with an operations background who has started to work immediately at straightening out the business, cutting away fat with a large knife. A year later, the Compaq acquisition is successfully integrated into the company.

New initiatives are underway.

Typically, it takes about three years for managements to see their decisions and actions reflected in the business. Our intrinsic value estimates are ahead of the stock market's pricing of HPQ shares. The company offers greater value than the market is recognizing.

The chart shows us the regression to the mean—first upward and then

moving toward fair value. Stock price is steadily being pulled up, closing at new highs over a period of a couple of years. The price is moving toward

the company's value stream but the stock still is being undervalued. This case example is relatively common; it helps us see how long it takes for an undervalued stock to be priced at intrinsic value. It is a time of opportunity for smart investors, confident in the use of their model.

The time frame incorporates macro and industry drivers as well as those specific to the company. Sometimes, the market can see the migration to intrinsic value occurring sooner. There isn't any average time frame, even though studies are being conducted to arrive at averages. One study shows a multiyear phenomenon of three to six years to reach fair value. Another study, by a major brokerage firm, indicates a 24-month average. These time lags yield opportunity for investors to buy shares while the stock is being underpriced.

Attitudes of investors don't change quickly. For HPQ, it took nearly three years to change the market's position. Absent a good analysis, it looked as if the stock price had fallen by almost 20 percent, indicating real problems for the company. In reality, at the time, the company was substantially undervalued; the stock literally was on sale. It was a great buy, and eventually the market caught up and priced the stock closer to fair value.

It can be educational to understand what is happening during that period when the company is being undervalued and the stock is underpriced.

Staying on board by maintaining a close analysis of the company and its fundamentals and related drivers is worth doing. What happens often is that assumptions about the business are overwhelmed by market behavior.

Investors get burned and are reluctant to buy shares again. Maybe they don't have the tools to estimate intrinsic value and gain the confidence to buy when the market is underpricing the stock. Still, their long memories of a bad experience keep them out even when management is making good moves and the stock is starting to recover.

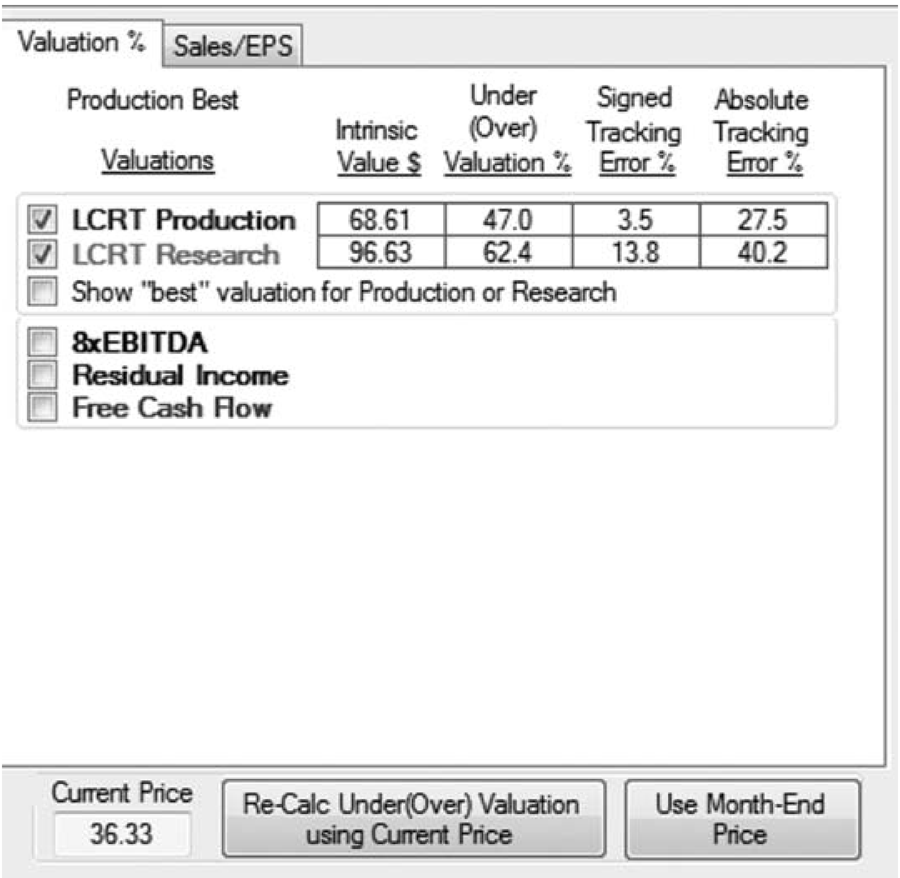
At the opposite end, a stock that is overvalued can be hit hardest. The

price tumbles rapidly. There likely was a major development: a piece of bad news, big negative earnings report, disappointing consensus forecast of EPS

by the analysts, a competitive breakthrough. The market often starts to run on perceptions—either the industry or company, or both.

PICKING THE RIGHT MODEL VERSION

In evaluating HPQ in Figures 18.15 and 18.16, we are deciding to focus on the two LCRT models, setting aside the other three. There's just too much noise from those other three. Besides, trying to use too many models can lead to confusion as you follow the temptation to consider and analyze all



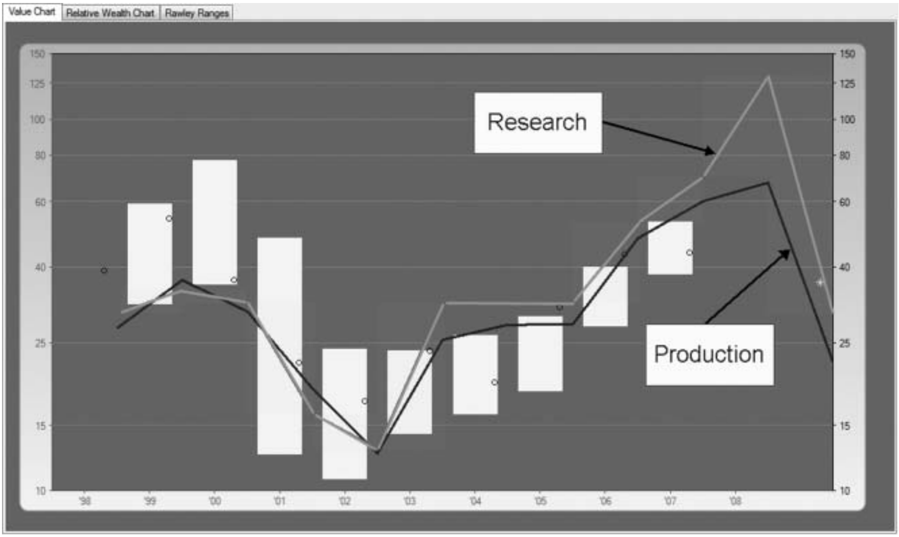


FIGURE 18.15

HPQ Production and Research Models

FIGURE 18.16

Best Models to Value Hewlett-Packard

the differences. In using a model, we don't want to go too far in considering all the nuances and differences. Through the tracking errors, we can readily see that the other three models are providing substantially less accuracy.

Also, they are all over the place; they aren't really tracking the market price in any reasonable relationship with intrinsic value. That says the models are giving us false signals.

We are taking a valuable step toward higher sophistication and deeper analysis by understanding the notion of applying multiple models and then reconciling them. We are going to put you at that level. We happen to believe in free cash flow, but others may start by favoring 8xEBITDA or residual income. Studying all five models enables us to see what each implies in terms of gaining a better understanding of the company's real value and how the market presently is actually

valuing the stock.

We can see the two models doing the best job of valuing Hewlett-Packard and which models to eliminate. Now we can focus on what these two selected models can do and can't do for us in making our decisions.

You will want to follow this procedure in analyzing each company.

Study the chart, note the intrinsic values and market price, analyze the tracking errors, and decide which models among the five to work with for this particular company. There is enough complexity; keep it simple and clean and don't be distracted.

We are, of course, always at work in refining the models. This will be a never-ending process. Our focus currently is on building a hybrid model that gives us the best of all worlds. We'll get there and we'll make sure you can stay with us as we go along. Right now, we are finding that the production model works better with some companies, but overall, the research model produces the best results.

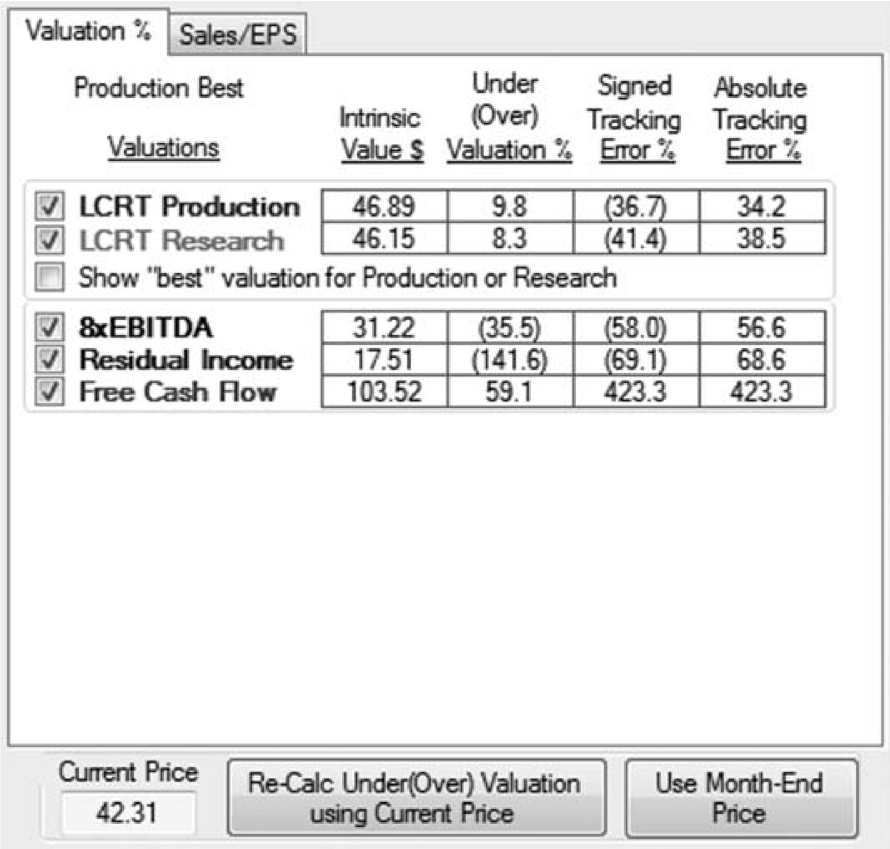
We are learning the patterns so that we can almost know which model is going to be best suited to valuing a certain company. We find that the production model works best in valuing companies able to sustain high growth and high returns. Main reason: The model doesn't regress returns all the way to the corporate averages, but instead regresses to a spread above the corporate average, which is consistent with higher return companies.

In contrast, the research model tends to regress these same high-growth, high-return companies to the mean corporate average.

However, we also have identified a weakness in the production model that we are working to correct. It fails to regress rising returns all the way to the top. Certainly, an investor wants to get a good look at the company's highest return possibilities.

You say you don't want to work that hard? Okay. Simply press the

"Best" button on your ValuFocus screen and the computer figures it all out for you and tells you which models to work with in valuing this particular company.



Production Best Valuations	Intrinsic Value $	Under (Over) Valuation %	Signed Tracking Error %	Absolute Tracking Error %
LCRT Production	46.89	9.8	(36.7)	34.2
LCRT Research	46.15	8.3	(41.4)	38.5
Show "best" valuation for Production or Research				
8xEBITDA	31.22	(35.5)	(58.0)	56.6
Residual Income	17.51	(141.6)	(69.1)	68.6
Free Cash Flow	103.52	59.1	423.3	423.3

FIGURE 18.17

Coca-Cola Company

For me, using the production or research model tells me that the market at this time is undervaluing Hewlett-Packard, and I should give serious consideration to making an investment in the stock. I'm a longer-term investor, who can wait for the market to move the price upward toward intrinsic value. I'll keep checking the intrinsic value readings of the models to make sure the stock continues to be undervalued. I'll also keep a close watch on the company. I continually study the fundamentals to make sure that nothing negative is occurring in the business, sector, or industry that likely will drive down the value, or even cause the stock to become overpriced by a market that isn't focused on fundamentals, but is deciding more on momentum.

CONTRASTING HEWLETT-PACKARD WITH COCA-COLA

In Figures 18.17 and Figure 18.18, we contrast HPQ with Coca-Cola and do some studying of the beverage industry. So we bring up the chart on Coke. We're going to add as a bonus a lesson on how to use ValuFocus and how to not use it. HPQ had a +3.5 percent signed tracking error with the

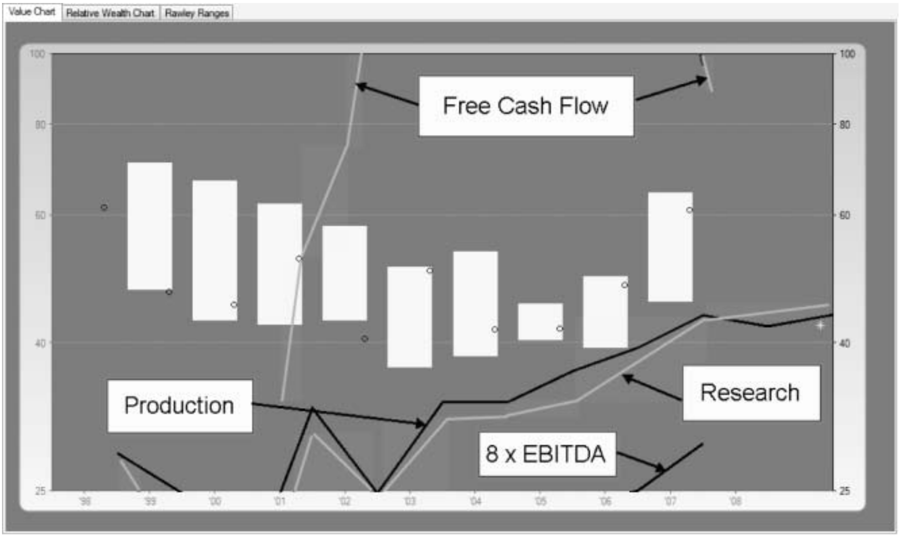


FIGURE 18.18

Coca-Cola Value Chart

production model, which was functioning as a leading indicator on where the company was headed and thus where the stock price would be moving.

Much of the time, highly popular Coke is being held in most institutional portfolios in sizable amounts, either because of indexing or because the company is the bellwether for the beverage industry worldwide.

Our models show the stock being substantially overvalued; indeed, it almost always has been. Our models show an intrinsic value between $46

and $47. In June 2008, a time when the market was quite soft, Coke

still is being priced at $42 a share. The models on the chart are saying that Coke is highly valued. The free cash flow model believes it is an $103 stock, twice that of our production and research models.

Why? We can speculate that Coke management has done a good job of getting rid of assets in secondary businesses, the key one being its bottling plants. The bottling side of the business is highly capital intensive. Coke management has created separate bottling companies and owns probably less than 20 percent of these production facilities; the market owns the rest.

As a result, these major, costly assets are not on the company's balance sheet.3

3The most recent examples of this implicit guarantee underlying much of the recent meltdown are Fannie Mae and Freddie Mac. Taxpayers had to come to their rescue as default of subprime mortgages increased, resulting in home price declines. At this writing, the government still is working on an exit strategy for these two now fully owned government firms in conservatorship.

Our goal here is to understand why the market continually overvalues Coca-Cola. We continue our research, looking at other assets. We learn that unconsolidated subsidiaries are reported on an equity basis, which results in the underlying liabilities and debt obligations of these subs not showing on the balance sheet. Coke management, of course, recognizes its obligation and has built a structure to keep its bottlers and suppliers viable no matter what happens.

So the legal structure is there and we want to get beyond it. We're looking here at a special-purpose entity kind of structure. Recall that Enron was brought down by special-purpose entities. We are not suggesting something similar is going to happen to Coke, but we are suggesting that the situation may call for some really good analysis to uncover what truly underlies the economics. Can our models turn it up? They won't go down that deeply, but they certainly are alerting us to the overvaluation and encouraging us to do some deeper digging.

A solution is at hand, but it isn't likely to gain the force of regulation.

The accounting rules should require proportionate consolidation. If you own 20 percent of the company, you consolidate 20 percent of its

balance sheet and include the liabilities. In reality, Coke owns 20 percent of the bottling operations but has a 100 percent liability. The company won't sell any of its beverages without the bottles and cans. Bottom line: Coca-Cola should be consolidating all of its entities and recognizing the minority interest, namely, the market value of what it doesn't own.

Our value chart in Figure 18.18 shows that Coke has been overvalued for a long time. Just look at the market pricing versus intrinsic value from 1998 through 2006. Investors call this "dead money." Still, the market price fell from $62 a share to $42, while remaining overvalued.

Investors were in a value trap; the stock was consistently overvalued but everyone had to own it. The stock floats along, with the price falling gradually, still sitting in everyone's portfolio, with nothing big happening to flush it out and no incentive to buy more. It represents the beverage segment of the portfolio, pointing out a problem for believers in the capital asset pricing model (CAPM) that requires maintaining a diversified portfolio covering every sector. Every big portfolio has a bunch of these "dead" stocks.

Our Coca-Cola story isn't all negative. Strong companies with smart managements are capable of engineering turnarounds. Our chart in Figure 18.18 shows that in 2006, the price of Coca-Cola shares had reached the value line; the stock was being priced at fair value. The migration was happening slowly. You can see where the inflection point occurred in 2002, as the economic intrinsic value started to grow.

This says to us that capitalism is working successfully. The business has gone through the pain, and management is beginning to put things

in place to grow value. Management now had a good plan to grow the business economically. From 1998 to 2002, no value was being produced economically.

Two convergences took place in 2002: New management was making sound plans to regrow the company. Again the market overreacted as momentum investors piled on, recognizing the improving economics being created by management. Stock price took off and soon the stock once more was being overvalued.

There is a lesson for all of us here: You can have an overvalued stock going to value and then being overvalued again, and maybe continuing that pattern for decades. The price falls to the value line when times are bad. Coca-Cola has been on that Ferris wheel for a long time. There was a time when Coke was a growth stock, a time when intrinsic value exceeded expectations and the equity was undervalued.

Want to do better? Find another sector and set of stocks. A purist, using the LCRT models, would have the courage to not hold Coke, allowing himself or herself (you) to be a little undiversified. Or look at other companies in the beverage industry that would be better to own, shown by our models to be undervalued. You can stay properly diversified if that's important to you.

NEITHER COKE NOR PEPSI

We compare Coke with Pepsi in Figure 18.19 and Figure 18.20. Everyone does. With its strong brands in the food space, Pepsi-Cola offers more diversification. It has a good record of steadily growing the economics of its business, but it too has tended to be overvalued. We can take some comfort in it being a company still steadily growing business-wise, even with its stock priced above value. Our chart shows the 2006–2008 time frame to be a flat period in terms of intrinsic value. We can assume that before 2006 the beverage business was holding its own while the food segments were doing well. Then both big pieces were stalled.

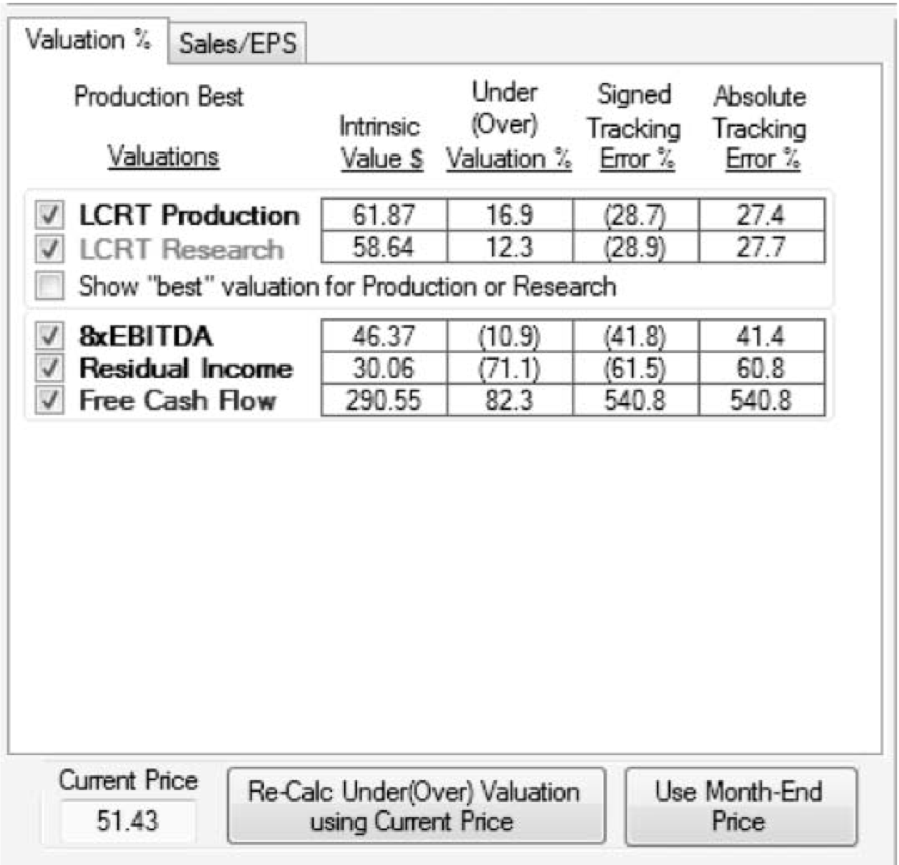
Within the beverage industry, we need to look beyond Coke and Pepsi.

We use the screening capabilities of ValuFocus to do this in Figure 18.21.

Here our intent is to add value to our portfolio. Working our computer and the models offered by ValuFocus, we call up the sector and the industry; there are multiple groups within a sector as well as within an industry.

We are searching for undervalued companies within the certain sector and industry, as well as for overvalued companies to make sure we avoid them or sell them if they happen to be in our portfolio.

ValuFocus is a handy tool that estimates the values of all the companies in the sector, industry, and groups within them. Importantly, it thus serves



Valuation % | Sales/EPS

Production Best Valuations	Intrinsic Value $	Under (Over) Valuation %	Signed Tracking Error %	Absolute Tracking Error %
☑ LCRT Production	61.87	16.9	(28.7)	27.4
☑ LCRT Research	58.64	12.3	(28.9)	27.7
☐ Show "best" valuation for Production or Research				
☑ 8xEBITDA	46.37	(10.9)	(41.8)	41.4
☑ Residual Income	30.06	(71.1)	(61.5)	60.8
☑ Free Cash Flow	290.55	82.3	540.8	540.8

Current Price
51.43

Re-Calc Under(Over) Valuation using Current Price

Use Month-End Price

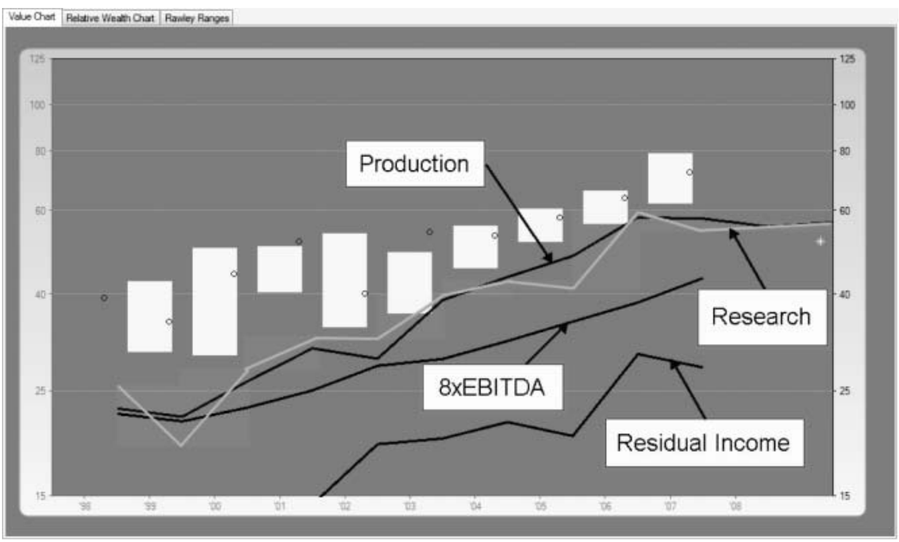


FIGURE 18.19

PepsiCo

FIGURE 18.20

Pepsi Co. Value Chart

Company | Screen | Results

Company	Ticker	Price	Intrinsic Value	Under(Over)	Seq
Pepsi Bottling Group Inc	PBG	20.71	47.44	56.3	1
PepsiAmericas, Incorporated	PAS	17.63	33.17	46.8	2
Coca Cola Bottling Co. Consolidated	COKE	45.01	83.64	46.2	3
Coca-Cola Enterprises Inc.	CCE	12.41	20.31	38.9	4
Coca-Cola Company	KO	42.31	46.89	9.8	5
National Beverage Corp.	FIZZ	9.23	10.17	9.2	6
Hansen Natural Corporation	HANS	35.46	35.63	.5	7

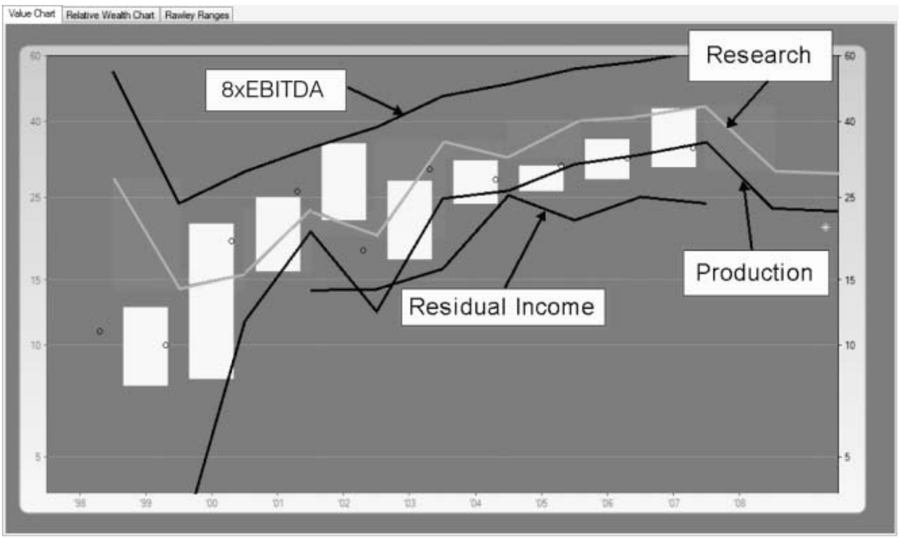


FIGURE 18.21

Food and Beverage Soft Drink Results

as a screener to look for investment ideas. Ideas are on a sector basis, down to the industry and groups. You can do a comparative value analysis between companies; look at one company, compare it with competitors and others in the industry, make a list for further study.

Figure 18.22 and Figure 18.23 shows that Pepsi Bottling Group. is the most undervalued in this group. Please remember this is February 2009, not the present time. ValuFocus is giving us a complete reading of the group, showing all the companies, their estimated intrinsic values, and the extent of their over-and undervaluation. By clicking on any company in Figure 18.23, we can see the level of accuracy of those numbers based on signed and absolute tracking errors.

FIGURE 18.22

Pepsi Bottling Group Value Chart

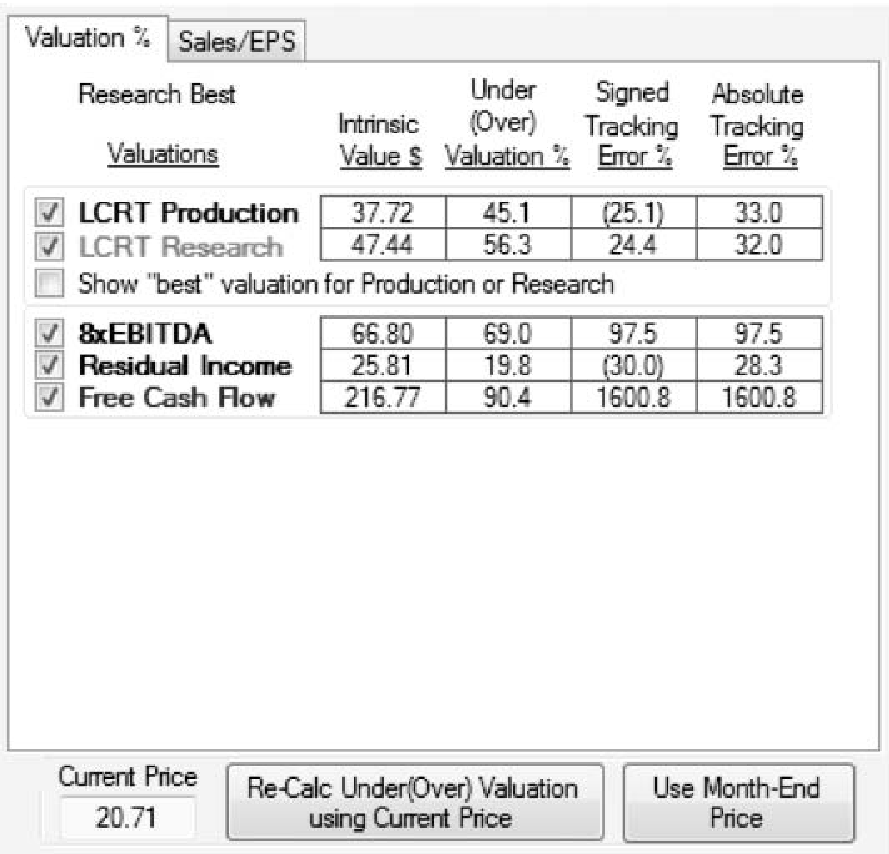


FIGURE 18.23

Pepsi Bottling Group

On your computer, you can call up the screens for each company to gain more information and conduct a comprehensive analysis in making decisions to manage your portfolio. This tool delivers significant relevance in managing a portfolio because it provides a context when comparing companies.

One good way to apply the process: Use the screener, identify companies that are overvalued, look for alternatives; swap your overvalued stock for your best choice in the undervalued group.

To wit: At this time, in the beverage industry, Coke and Pepsi are overvalued, so shop for an undervalued replacement. Looking good as undervalued possibilities are Pepsi Bottling Group, Pepsi America, and Coca-Cocla Bottling. The bottling companies are a far different business from the drink suppliers. The bottlers also produce the water products, which have been strong sellers. A note of caution is in order here. The charts indicate high levels of tracking errors, even though they indicate undervaluations for the bottling companies. The research model especially likes the bottlers.

It is vital for investors to keep their own research in order. Remember that the models are working from historical data, giving added importance

to your efforts to add new information, gathered by yourself and by close study of the ongoing output of the analysts and other good investment sources. Companies are constantly in motion, often rapidly buying and selling businesses, creating new technologies and obsolescing others; your chosen model may not pick up some of these inflection points. That becomes your job.

INCORPORATING REVENUE AND EPS FORECASTS

In fact, that's the main reason we added a tab to include revenues and EPS

forecasts. In continually refining the LCRT models, we now are incorporating forward-looking information. The models now ask and answer the question: Would the intrinsic value be different if the company meets earnings expectations for the coming year? You can input into these models the company's forecasts, consensus analysis forecasts, your own projections, or any other you choose. We have decided that including earnings adds value to the model.

We know we are die-hard cash flow advocates, but earnings aren't a bad metric to consider in the total valuation process, as long as you combine it with all the other nonearnings cash flows and balance sheet information.

Indeed, you can reverse engineer the proposition. Instead of adjusting the assumptions made by the model based on the additional research you gather, keep the model's assumptions constant and use the sales and earnings as variables. Make assumptions about them instead. Then, recalculate the profit margin and allow the model to give us another view of the future.

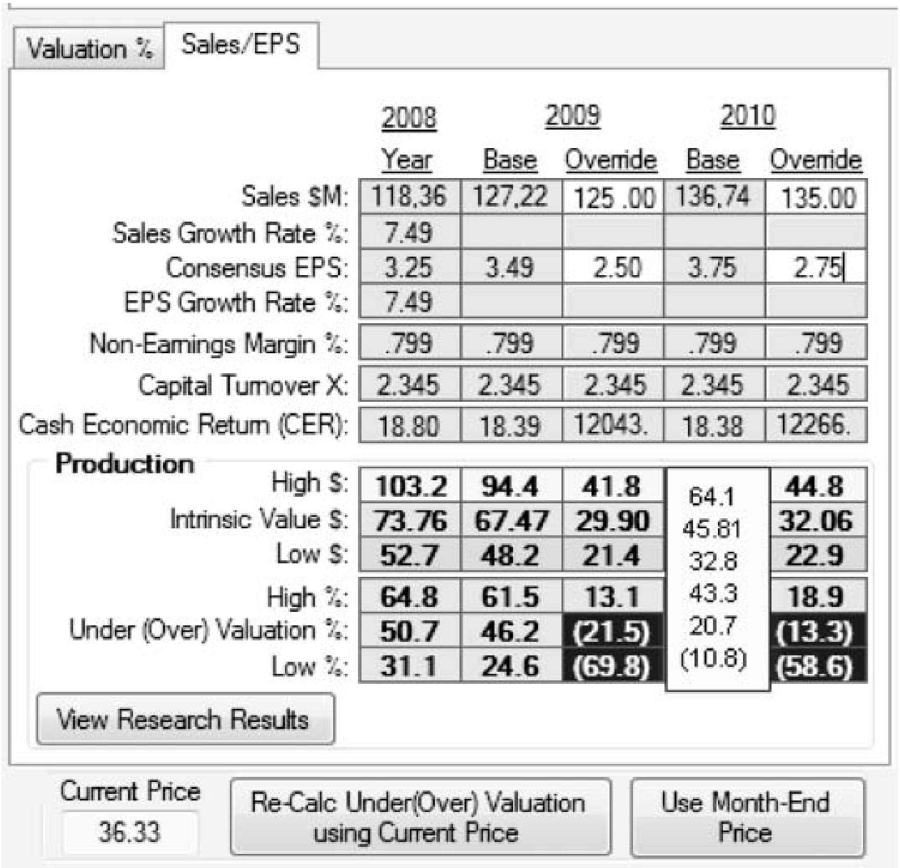
We use Hewlett-Packard as an example. Earnings for 2008 as reported are $3.25 a share in Figure 18.24. We are using our LCRT production model. The model is making its calculations for earnings per share from the base year. You are overriding the model to have it work with an EPS

forecast of intrinsic value, using numbers from a source you believe is reliable—Yahoo, Zacks, Thomson/Reuters, Starmine, your broker. Let's say the numbers you come up with are $2.50 in 2009 and $2.75 in 2010.

Add $125.00 and $135.00 in sales for 2009 and 2010, respectively. As the investor, you are putting in the consensus numbers for the next two years, and the model is churning out an intrinsic value for HPQ based on these earnings and sales forecasts.

The model is keeping the nonearnings margins and capital turnover numbers as constants through these three years and calculating a new cash economic return (CER), modifying the profit margin to reflect the numbers.

Our model says the company is worth $73.76 in the 2008 base year and is forecasted to be worth $29.90 the next year in 2009. As the chart indicates, the 2009 earnings override has the value at $29.90 a share, $32.06 in 2010.



	2008 Year	2009 Base	2009 Override	2010 Base	2010 Override
Sales $M:	118.36	127.22	125 .00	136.74	135.00
Sales Growth Rate %:	7.49				
Consensus EPS:	3.25	3.49	2.50	3.75	2.75
EPS Growth Rate %:	7.49				
Non-Earnings Margin %:	.799	.799	.799	.799	.799
Capital Turnover X:	2.345	2.345	2.345	2.345	2.345
Cash Economic Return (CER):	18.80	18.39	12043.	18.38	12266.
Production					
High $:	103.2	94.4	41.8	64.1	44.8
Intrinsic Value $:	73.76	67.47	29.90	45.81	32.06
Low $:	52.7	48.2	21.4	32.8	22.9
High %:	64.8	61.5	13.1	43.3	18.9
Under (Over) Valuation %:	50.7	46.2	(21.5)	20.7	(13.3)
Low %:	31.1	24.6	(69.8)	(10.8)	(58.6)

FIGURE 18.24

Hewlett-Packard with Overrides

We would call this a classic earnings-built inflection point to occur in 2009; this charting is being done in January 2009 based on October 2008 reported data. We are operating in the world of forecasting. Our LCRT production model declines intrinsic value to $67.47 with an EPS projection of $3.49 a share and its normal fade calculation. However, the model is telling us that it may be fairly valuing the stock if HPQ meets the $2.50 2009 forecast.

Our model is giving out analytics that say the future will be different from the forecasts. So we have our LCRT production model pitting itself against the adjustments in assumptions built around earnings forecasts.

Which will be more accurate in estimating intrinsic value?

Incidentally, we can conduct the same exercise using the research model.

It indicates higher numbers compared with the production model.

BASIC PURPOSE: PREDICT FUTURE STOCK PRICE

We are about the business here of predicting stock price. Our model is giving a value of $73.76 with a $3.25 EPS for 2008, and a value of $29.90 with a

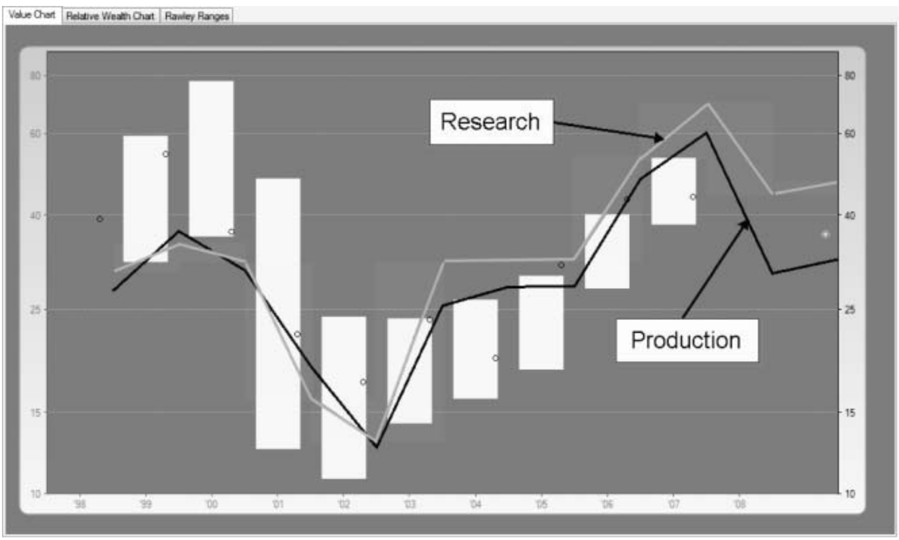


FIGURE 18.25

Hewlett-Packard—Sales and EPS Overrides

$2.50 EPS for 2009. The chart is showing the current price at January 2009

to be $36.33, meaning the market presently is overvaluing Hewlett-

Packard slightly. Take a close look at the intrinsic value estimation projections; the forecast is for value to go down and then up. The model may be suggesting to us when to buy shares and when to sell them as HPQ realizes actual earnings.

Let's review what we are doing here. You have picked your model, the production or research model, and now you want to see if the forecasts match the model going forward. Is history giving you an accurate view of the future, or are changes occurring? Should you be relying on the model or more on your own research and the good work being done by the analyst community and other sources of data and wisdom? Our model is saying change is occurring at HPQ, creating new expectations. Still, the market currently is overvaluing the stock.

In Table 18.1, we can ask what price the model is indicating and work the model to see how different EPS forecasts impact intrinsic value. We put in a $3.00 EPS forecast and the model recalculates the intrinsic value, moving it from the actual $36.33 price to $36.80. At $2.00 a share, the value goes down to $23.00. At $2.25, it goes to $26.45, and at $2.75, it goes to $33.35.

Based on its earnings forecasts, the market isn't being very optimistic.

At $36.33, the market is saying that earnings are going to slip from $3.25 in 2008. In this scenario, the market (the community of analysts and investors) expects the company to just maintain revenues, causing profit margins to be

TABLE 18.1

Sensitivity of Intrinsic

Valuation to EPS Forecasts

2009 EPS	Intrinsic Valuation
$2.00	$23.00

$2.25

$26.45

$2.50

$29.90

$2.75

$33.35

$2.97

$36.33

$3.00

$36.80

squeezed, resulting in earnings of $2.97 a share. That leads you to ask: What are the chances of Hewlett-Packard not beating $2.97 a share in 2009? The market is pricing the stock based on earnings of $2.97 a share in 2009 and our best estimate is only $2.50.

TAKING ADVANTAGE OF THE FLEXIBILITY OF VALUFOCUS

You can see why we call this stock-picking process ValuFocus. You can work a host of scenarios. Looking at all the forecasts, you can see some analysts projecting a low EPS to justify the price.4 They are saying the price reflects intrinsic value, meaning the market is fairly valuing the company.

4As we have shown, intrinsic valuation is extraordinarily sensitive to the terminal value assumptions. Frankly, when the analyst controls both the valuation model and its terminal valuation assumptions, he or she can derive almost any intrinsic valuation possible from those subjective judgments. The temptation exists for the analyst to tweak the terminal value assumptions so his or her intrinsic valuation remains consistent with their subjective conclusion of buy, hold, or sell.

By empirically validating both the valuation models and their parameterization, we remove the temptation to plug the terminal value assumptions to fit either the current price or the subjective conclusion of buy, hold, or sell. Terminal valuation model empirical validation therefore improves the analysts’ ability to add to the

investment predictive process with their deep insights into the company, its industry, and the economy over the next two to five years. The analysts even may collect new data (off-balance-sheet items, for example), that add to the process and should be disclosed by the company and collected by data vendors.

Some academic empirical evidence confirms the tendency for analysts to adjust their earnings forecasts after price changes. Objective earnings forecasts should be made independently of today's price.

This also assumes the company meets revenue growth projections. You can change these numbers. One reasonable possibility: Change the margins and maintain sales growth. Or lower the revenue number. We did that with HPQ and got an intrinsic value of $29.90—no change.

You even can work the process backwards, starting with how the market is pricing the stock at the time. The question becomes what earnings performance does the market need to justify the current price versus what the model says the company is worth.

As a tool, ValuFocus enables you to be quite analytical, trying out various scenarios and financial outcomes, working the model company by company in building a portfolio. Trust the model: Pick undervalued stocks.

As you can readily see, you can spend as much time as you want in using the model to make decisions. The model helps you focus on the issues. It can be a case of history not determining the future of the company and the worth of its equity. Use the model to answer the question: What does the market think is the future of this company, and do I believe that's a realistic assessment and expectation? Or will the company do better or worse?

Here's where you want to build a solid information base, indeed, an information advantage. Do your research. Study the reports of the analysts following the company. Analyze the institutional shareholder base to gain a sense of the types of investors who are buying and selling shares. Their actions can yield clues on how the market views the future of the company.

Listen to management's conference calls. Read copies of presentations.

Work the company's investor relations web site for information.

We encourage you to develop your own expertise on how to take full advantage of the capabilities of a model. With ValuFocus, you have five models to work with, although we certainly favor our LCRT production and research models and have more faith in the free cash flow model than the residual income or 8xEBITDA models. We think we have proved the inaccurate reading likely to be given by these last two models, along with the dividend discount models dissected in Chapter 14, "Our Automated DCF Model—The Better Model."

The key is to build the broadest and deepest understanding of the workings of the model you are using to value each stock. Understand the ways in which the model delivers the most accurate readings and where it is likely to be off target. Remember, the model uses history and does things like project return on asset trends, certain growth, and fade rates.

It is instructive to gain all the insight you can about a company's fade rate. Fade rates are tied closely to the following:

- The success of new products.
- Effects of competition.
- New technology being created by the company or its competitors.

- Expense levels and whether they are rising or being controlled or lowered.
- Whether profits are moving up or down.

I'm sure you and your research work can add many other factors.

Keep in mind that our models have half the companies in the universe over-and half of them undervalued at any time. The models show which companies fall into each group. You want to choose from those companies being undervalued. Then, you want to be on the lookout for inflection points that eventually will drive the market toward buying shares in those undervalued companies and reducing/selling their positions in the overvalued stocks. Our models are saying "This is how the market appears to be pricing cash flow at this time." There will be variances and inflection points caused by company, industry, and macro factors.

THE IMPORTANCE OF FADE RATES TO INTRINSIC

VALUATION

Our charts on Hewlett-Packard serve as a good example of understanding a company's fade rate. You may feel that HPQ's product lineup and pipeline indicate a lower fade rate. Figure 18.26 shows the base case using the LCRT

System's fade rates for both CER and growth. The intrinsic value is about $60. Figure 18.27 shows the effect of a zero CER fade rate. The intrinsic value jumps 50 percent to $98!

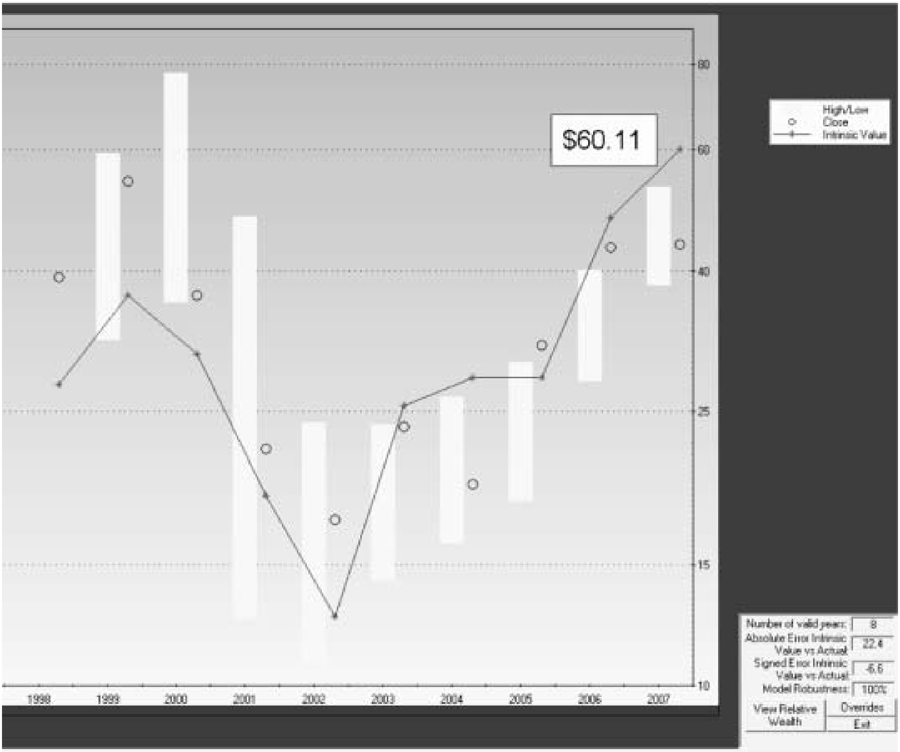
Figure 18.28 displays a $316 intrinsic value with a zero growth fade rate. Figure 18.29 displays a whopping $569 intrinsic valuation with zero fade rates for both the cash economic return and the growth rate! $569

is 9.5 times the $60 intrinsic valuation with fading both the CER and growth rates. Clearly, fade rates made a huge difference for high-return, high-growth firms.

It certainly helps to understand thoroughly the finance implications of a company's cash economic and growth fade rates. The market won't buy into the analysts' typical kind of perpetuity projection, especially when considering the company's intensifying competitive position.

Still, it certainly is the case that a number of companies fade up. Hewlett-Packard can do so, based on the models' high CER. Certain companies can grow at levels above the general economy's 3 percent level. A fascinating footnote is in order. The economy grows at 3 percent, but investors are looking to buy stocks of companies that grow at 7 percent or more. How can that be? Well, it is the economic world in which we live. Some companies are absorbed, some go bankrupt, some grow fast, and some grow slowly.

As my portfolio manager friend Lee Hayes once said, a coach told him that


$60.11
80
60
40
25
15
10
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
High/Low
Close
Intrinsic Value
Number of valid years: 8
Absolute Error Intrinsic Value vs Actual: 22.4
Signed Error Intrinsic Value vs Actual: -6.6
Model Robustness: 100%
View Relative Wealth
Overrides
Exit

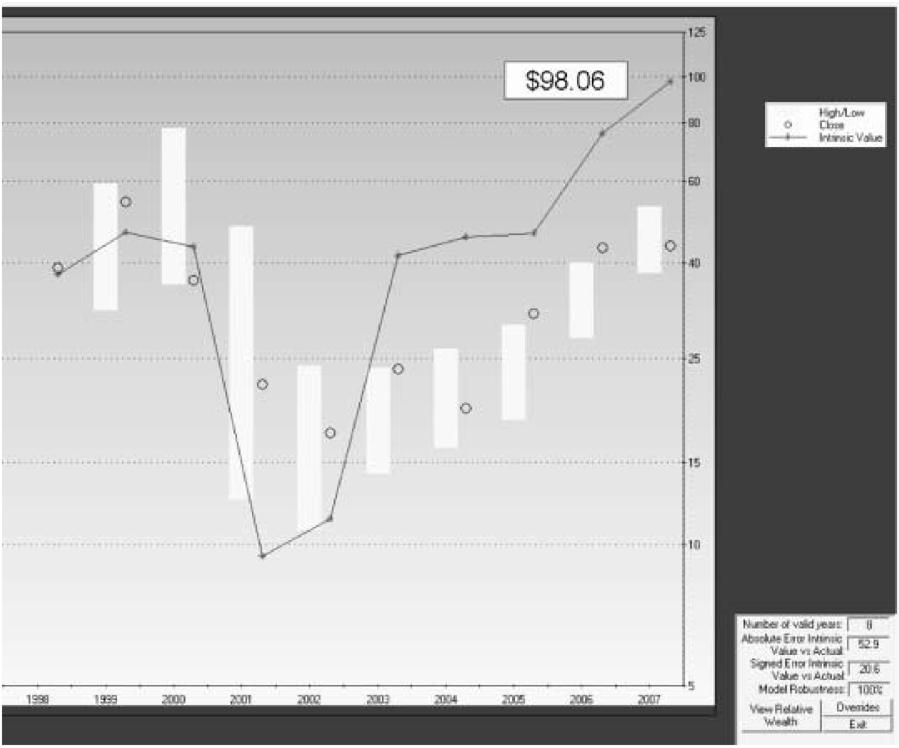
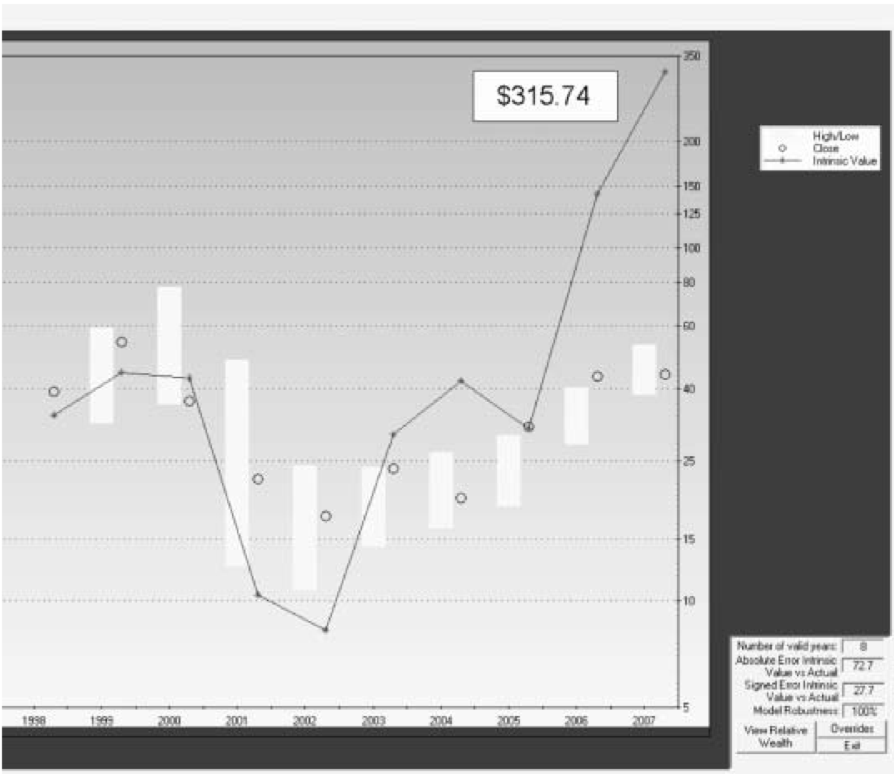

$98.06
125
100
80
60
40
25
15
10
5
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
High/Low
Close
Intrinsic Value
Number of valid years: 8
Absolute Error Intrinsic Value vs Actual: 52.9
Signed Error Intrinsic Value vs Actual: 20.6
Model Robustness: 100%
View Relative Wealth
Overrides
Exit

FIGURE 18.26

Hewlett-Packard with System Fade Rates for both CER and Growth

FIGURE 18.27

Hewlett-Packard with Zero CER Fade Rate and System Growth Rate



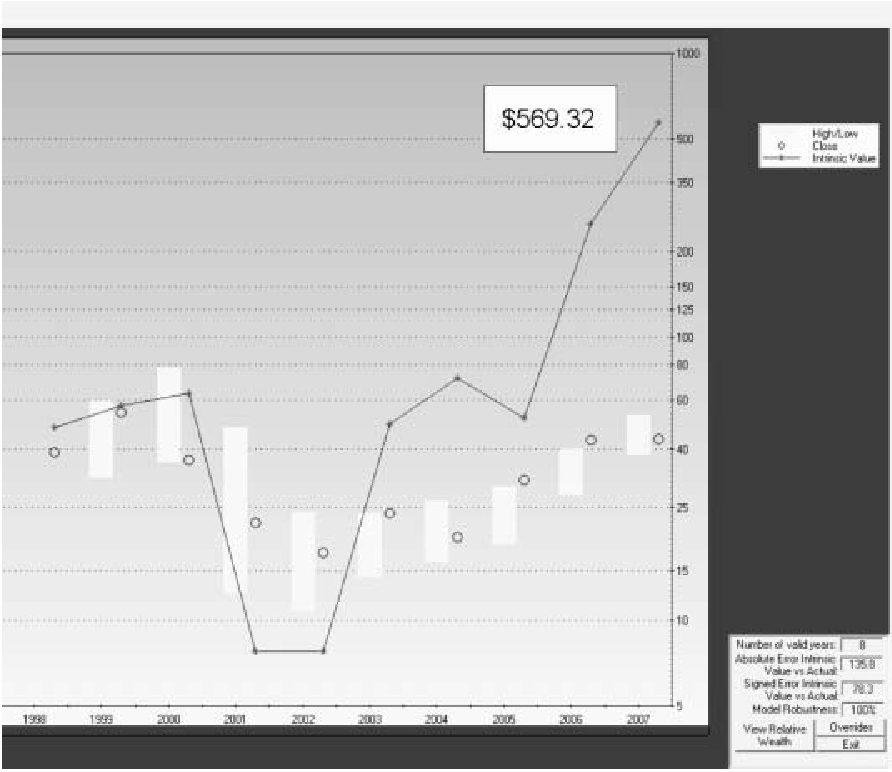


FIGURE 18.28

Hewlett-Packard with System CER Fade Rate and Zero Growth Fade Rate

FIGURE 18.29

Hewlett-Packard with Zero Fade Rates for both CER and Growth

an average is a number that no team ever makes. A football team averages 34 points a game but never scores 34 points in any single game. In investing, we think the average is the return everyone makes. Not so.

How intense do you want to be in your portfolio management? How much time and effort do you want to expend in working with ValuFocus?

You can skim along and still do well. Or you can be a full-time practitioner, working this tool to the max.

At minimum, pick the most undervalued stocks and don't worry about the risks coming from news events, EPS rising and falling, industry and company inflection points, and the other drivers of price. Pick companies you know the best, use your good intuition, be diversified. Do we recommend this approach? It's okay, but we say work harder and get more from using our models, methods, and processes.

CONTINUING DEBATE: DETERMINING THE RIGHT

DISCOUNT RATE CREATED FROM LONG-TERM

GROWTH RATES

Setting the long-term growth rate and the associated market-derived discount rate are critical steps.

We don't want to go too ethereal here in our discussion, but it is worth noting that the forever-to-be issue with cash flow modeling is the discount rate, namely, trying to know what to do with long-range perpetuity.

Our models currently set a 3 percent long-term sustainable growth rate for all companies. A continuing harsh economy could cause us to lower that rate to 21 / 2 percent or even less.5 But we don't modify the number for a particular company. Plus, this is on a global basis. You can argue 5Imagine what would happen if the monetary authorities of each country, along with the ratings agencies and data vendors, collaborated to determine the quantitative economic drivers of core macro variables, such as real country growth rates, interest rates, exchange rates, and country debt capacities; all as functions of tax structures, tax rates, property rights, legal structures, monetary policies, and so on. Imagine how the deep understanding produced by these models would help public policy discussions and investors!

The model-building principles outlined in this book, of price levels instead of price changes, along with ranges of bounded rationality, could help immensely in those cooperative research efforts.

We are bold enough to suggest that the model-building principles outlined in this book represent a revolutionary new paradigm for understanding the capitalist economy.

reasonably that the number could be more company-specific, based on its performance, ability to retain and effectively use cash, dividend policy, and other factors.

The real discount rate that sets current prices to equal the present value of cash flows is derived from assumptions covering each country's real growth rate. That is sure to be a continuing discussion among model builders on how best to set the broad system parameters for intrinsic valuations.

Take a minute, please, to think that truth through. Now you are really working ValuFocus fully.

KEY TAKEAWAYS

1. Importantly, ValuFocus simplifies the investing process. To avoid the complexity that turns people off, LCRT hides all the automated discounted cash flow calculations "under the hood." In this volatile market, accurately valuing a company becomes the critical advantage.

2. For multiple intrinsic valuation models, ValuFocus contains an incredible amount of valuable displays.

■ Charts with model intrinsic valuations juxtaposed against fiscal year high/low prices, along with prices at fiscal year plus three months and current price.

■ Tables with intrinsic valuation and under/overvaluation.

■ Space to enter your own sales and EPS estimates for future intrinsic valuations, translated to compare against today's price. These overrides customize the valuations from your wise insights into the competitive conditions of the firm within its industry.

■ Relative wealth charts with the LCRT models' primary drivers: cash economic return, growth rates, and cumulative wealth created for investors.

■ To identify price inflection points, Rawley ranges of bounded rationality offer a conceptually sound method for you to increase your investment portfolio performance.

■ Tables that summarize under/overvaluation results for each industry or sector.

■ Tables summarizing the accuracy of each model covered. Recall that more accurate models are more predictive to help you achieve higher returns at lower risk.

■ Analyzing pairs of competing companies, like Coke and Pepsi, to help understand outliers. Importantly, analyzing outliers by security analysts should provide insights into supplemental information that

data providers should collect and modelers should incorporate to reduce bias, increase accuracy, and therefore predictive capability.

Improved predictive capability gives you an information advantage over others in the market. Less informed traders and investors are the people with whom you want to conduct transactions.

■ Strategic variables constitute a set of variables worthy of inclusion.[6]

■ Value charts illustrate the huge importance of fade (academic "regression toward the mean") in the cash economic return and system growth rate. Zero fade rates produce incredibly high and unrealistic intrinsic valuation for Hewlett-Packard. Fade enables the models to transform a traditional multiperiod, security-analyst DCF forecast into a single-period model. A single-period model enables empirical testing for robustness, nonbias, accuracy, and predictive capability purely on historical data without analyst intervention.

3. Setting the single market-derived discount rate each year to its associated long-term country economy growth rate represents a critical model parameterization step. Ideally and eventually, the growth rate for each country will be based on extensive empirical evidence by the Federal Reserve, rating agencies, and others on its relationships with tax structures, tax rates, monetary policy, fiscal policy, and freedom-related microeconomic structures, such as property rights.

6Robert D. Buzzell and Bradley T. Gale, *The PIMS (Profit Impact of Market Strategy) Principles: Linking Strategy to Performance* (Free Press, 1987).

Please see also Alfred Rappaport, *Creating Shareholder Value: The New Standard for Business Performance* (Macmillan/Free Press, 1986); and *Creating Shareholder Value: A Guide for Managers and Investors* (Simon & Schuster/Free Press, 1998).

CHAPTER 19

Managing Your Stock Portfolio

You are ready to pick undervalued companies and stocks.

You are ready to build a stock portfolio and manage it.

We believe our models do the best job of any developed thus far. We can estimate the intrinsic values of some 7,000 companies in our database to identify those currently being under-and overvalued by the market. That serves as the basis to begin the research to decide which ones to buy because they are undervalued and any that might be in your portfolio to sell because they are overvalued. In both cases, we are confident that market prices eventually migrate toward fair value, proven by our empirical evidence.

Our model's ValuFocus screener enables you to identify investment ideas. Importantly, it goes beyond simply selecting stocks to buy and sell.

Managing a stock portfolio is a complex process.

Unless you are very rich, you probably want to have fewer rather than more stocks in your portfolio. Who can afford to buy shares in all 500 stocks in the S&P index at their properly proportionate numbers? All that does anyway is enable you to replicate the returns of the index. That's fine when the market is going up steadily. We all know that isn't guaranteed.

Smart investors can do better than the market, while making investments in considerably fewer than 500 stocks. Your goal focuses on achieving good returns. You are setting your targets. Be realistic but also be optimistic that you can do well.

It helps immensely to have a longer-term focus when buying into our philosophy and strategies and tools. We believe in the economics of a business built on cash flows, the company's ability to sustain and grow them while managing expenses effectively so it can generate excess cash.

That cash is used to reward investors and accumulate capital that is invested wisely to continue adding assets that earn high cash returns. Cash economic returns serve as the metric of matter to us.

With a longer-term investing strategy, you can put those undervalued stocks into your portfolio and wait for the price to rise as investors realize the firm's fundamentals are solid and improving. The company is growing, reflected in rising cash flow levels and cash economic returns. Or it certainly is likely to grow as more and more investors catch on. You are watching 191

for inflection points, seeing them early, and being patient as other investors begin to recognize them as well.

Be sure to sell those overvalued stocks, patiently probably over a predetermined time frame. If you happen to hold a big position, don't dump all the shares at once; you just might play a role in alerting or scaring investors.

A longer-term strategy along these lines with a portfolio essentially containing underpriced stocks of companies with solid fundamentals and good growth prospects can enable you to hold fewer rather than more positions.

We can't give you an ideal number. It will depend on the amount of money you can afford to invest in your portfolio, your return target, and the amount, depth, and quality of your personal research. Plus the extent of the time you can give to working the models.

But there certainly are good reasons to hold fewer rather than more companies. It is desirable to limit the number of trades you need to do. Trading costs and price impact can cut into returns and just plain are expensive.

There are capital gains taxes to consider. Timing comes into play here.

We personally know investors achieving their return goals with portfolios consisting of 20 to 30 stocks. We also know others with much more sizable portfolios.

Not every choice will work out successfully. No model is perfect. No one can predict the future with perfect precision. That's one reason we offer multiple models and encourage you to test each to see which seems to work best for the company you are considering. Our tracking error analysis helps you decide the better model for each company. Stock price performance history serves as an important aid.

Some companies and stocks will disappoint. Some companies will become overvalued, based on market prices flying above intrinsic values, with investors sure to start selling them. You will want to sell the losers and overvalued stocks early so you can lock in the gains. Those trading costs become unavoidable.

Once your portfolio is set initially, constant attention to the companies comprising it becomes essential. Change is the one thing we can be sure of, so you will want to keep a continuous (daily) watch on the companies in your portfolio. Your research updates are company specific and also cover the industry, sector, country, economy, politics, and other macro drivers of value. Successful investors track all the developments that may impact a company's value, working that analytical and disciplined mind of yours nonstop.

What to watch for and how to get the information: Read the company's quarterly disclosure reports and press releases. They are available online in

the investor relations section of each company's web site. There is plenty of additional financial, operating, and other information on those web sites as well. It is common to find copies of CEO and CFO presentations, detailed financially based fact books, the latest annual report, names and contact information of sell-side analysts following the company, and much more on those web sites. Two helpful hints: Look for discussions of strategies and especially note any changes in them. Seek information on management's view of its primary intangible value drivers.

The Securities and Exchange Commission (SEC) is an excellent source of information. Its web site gets you to the disclosure filings of public companies through its Edgar data source. Numerous other web sites provide the same and similar information. Examples include Yahoo Finance, S&P CapitalIQ/Compustat, Morningstar, Thomson/Reuters, Zacks, Edgar OnLine, Moody's, and Fitch. PR Newswire, Business Wire, and other dissemination sources carry company press releases and tons of other corporate information. You can access analyst research reports and quarterly/annual forecasts of earnings, revenue, and other key numbers on such sites as CapitalIQ, Thomson/Reuters, Starmine, Abacus Analytics, Yahoo, and Zacks. Google and Bing get you to most company and disclosure web sites. Brokerage firm web sites are available and include commentary and data on the economic landscape, political environment, industry and sector performance,

and specific companies.

As a shareholder, you might be able to build a relationship with companies' investor relations officers, but don't be surprised if they give you their time sparingly. Their main focus is on influential sell-side analysts and institutional shareholders, already with big positions in the stock or candidates to become major holders.

Most times, the best way to start building a portfolio is by studying the sectors and industries. Our ValuFocus is an excellent tool to screen by sector and industry. Our LCRT model contains annual updates of financial data, soon to be quarterly.

As we wrote before, if you don't have the time or inclination to work that hard, rely on our models. Select the stocks that are shown to be undervalued, based on estimates of intrinsic value shown to be the most accurate according to the two sets of tracking errors. Diversify your portfolio to cover sectors and industries exhibiting the best performance and prospects for growth.

In our ValuFocus, we actually rank stocks from the most undervalued to the most overvalued. We also break these rankings out by sector and industry. In fact, we have extended these listings to show stocks ranked on the basis of their cash economic return. We also have under-and overvalued stocks, covering startup companies, value and growth companies, large and medium and small capitalizations, and extent of leverage. Whatever criteria

and measures you favor, you likely can find lists of companies shown to be undervalued and overvalued.

WAYS TO WEIGHT STOCKS IN YOUR PORTFOLIO

Please pardon us a little if we are revisiting some ideas presented in previous chapters. The content is integral to those chapters as well as to this important subject of how best to manage your portfolio. We want you to feel satisfied if you read only certain chapters or refer back to them. Plus, reviews are often good.

Having a well-balanced and well-diversified portfolio has two key purposes. One is to optimize returns and the other is to reduce risk.

Selecting stocks that will grow in value is the first step. Determining the number of shares of each stock to own is the other part of this puzzle.

Call it maintaining a proper balance of stock positions to achieve a healthy diversity.

Essentially, there are three considerations in weighting the holdings in your portfolio. How many shares of each stock should you have in your portfolio? The first way is by market capitalization of each company. You are weighting the shares based on the relative float of each holding—more shares of the larger companies and fewer shares of the smaller companies.

Price movements up or down impact the number of shares you own. You can take larger positions in the bigger cap stocks and still be a small player for that company as a shareholder. An outsized position in a small company can be opportunistic or more risky, depending on whether the company flies or crashes. The best answer doesn't come easily.

Second option is giving equal weight to each holding. Is this done by the number of shares or by the dollar amount of the investment? A thousand dollars will buy 10 shares of a $100 stock and 1,000 shares of a $1 stock.

Again, the judgment call involves opportunity and risk. If you have done your homework and are fully confident of the growth of that small $1 a share company, you might make a fortune. Or lose $1,000. Ten shares of that $100 stock probably offers less risk and a smaller return gain. The best answer doesn't come easily.

Or, three, you can weight the stocks in your portfolio on the basis of their intrinsic values. This is our preference. Pick stocks with intrinsic values greater than the current market price, diversify by sector and industry to the extent that makes you comfortable. Weight your positions as you like, probably holding more shares in the most undervalued stocks. Stay away from stocks shown to be overvalued or carefully move out of any presently in your portfolio.

Weighting stocks by their intrinsic values also yields the opportunity to achieve more concentration, holding fewer stocks, saving on transaction costs, and hopefully being able to keep these positions in your portfolio longer because they are continuing to grow in value.

We continue to work at learning more about the ability to compare intrinsic value weights with capitalization weights and equal weights. We expect to report back to you our findings. We want to be able to quantify the returns that can be achieved by weighting stocks on the basis of their intrinsic values with positions determined by market cap and equal amounts of investment. We also are working to determine returns by comparing intrinsic value weights with such fundamental drivers of value as revenues, earnings, and gross cash flows.

Our purpose in all of this research and analysis is to continue to improve our ability to achieve the best risk-return performance. We want to minimize risk while optimizing return. We strongly believe that Benoit Mandelbrot's fat-tailed risk measures are superior to the traditional Gaussian normal ones. Linking intrinsic value to various drivers of value offers opportunity to measure and quantify the impact of each driver on value and even to rank them.

We offer a simple linkage as an example. It involves overweighting the most undervalued stocks based on the distance between the current price and our estimations of intrinsic value. Risk is minimized since the market prices are sure to migrate toward intrinsic value.

RISK AND CONCENTRATION

Of course, a highly concentrated portfolio generally increases risk. Focusing on undervalued stocks helps mitigate that risk.

We discuss portfolio concentration at length at the end of Chapter 28,

"Incorporating Risk into Our Model." Rather than repeat all that, we urge you to study it in the context of managing your portfolio.

REBALANCING YOUR PORTFOLIO

Recent research is quite helpful in determining when it is best to rebalance your portfolio. A key factor in optimizing returns centers on the combination of constructing and managing your portfolio. Rebalancing is a critical piece of this. It chiefly involves the timing of when to buy and sell shares. In no way are we suggesting that you become more of a trader. We essentially are longer-term investors. But our ongoing analysis of the market reveals portfolio rebalancing strategies that can work very well.

We cite a study we did with a major investment management firm conducted in late 2009, indicating the best time to buy and sell shares following an event that is sure to impact the price of the stock. That event is likely to cause an inflection point. It can be major news about the company or its industry, buy/sell recommendation from an influential brokerage or institutional investor, significant change expected or reported in a new research report from a leading analyst, or change in analysts' consensus earnings/revenues forecasts. The power of commentary by one highly respected analyst or big institutional shareholder can trigger an inflection point.

Our study shows that the best time to sell the shares is on the first day after the recommendation or news hits the market. However, the best day to buy shares is on day five after the event. Market behavior is at play here.

The market reacts instantaneously to the news; indeed, it overreacts. So, in the case of a sell recommendation from an analyst, for example, you want to get out right away, because the market will react negatively immediately.

On the buy side, however, the market overreacts. On day one the price jumps, but thereafter the price continues to come down, reaching its low point by day five. That's when you buy the shares.

For us, this becomes a superior trading strategy. Again, we are not becoming day traders.

We are reacting wisely to events taking place in the market involving a particular company. We are describing a portfolio construction strategy—when to rebalance your portfolio, relative to a new analyst recommendation or when other new information becomes available.

Or, it may be that our LCRT model is processing new information to change its recommendation—say, from a buy to a sell on a certain stock.

You want to sell immediately before the market gets in and drives the price down further. You can use those proceeds to buy shares in other companies.

Or wait until the price has likely hit bottom before reinvesting in the same company because our model now shows it to be undervalued, probably due to market overreaction.

Our study at this time is somewhat limited, covering a single industry.

However, the reality is there. It may be applied more broadly across the equity universe. The study is giving us an intelligent path for making buys and sells to rebalance our portfolio. In managing your portfolio, you want to track the stocks you own, ready to take action should a big event be about to impact the price.

As a good manager with a longer-term horizon, you may want to review your entire portfolio, perhaps quarterly. You may want to make sure the companies remain undervalued, aren't being overvalued, or aren't being buffeted by news that prompts applying this sell/buy strategy. This review also can include an updated analysis of the fundamentals of each

company and industry, conducted one company at a time. It may be that macro or industry/company-specific change is suggesting that you review your decision for holding the stock. Indeed, those fundamental changes may suggest selling, or alternatively, even increasing your position.

KEY TAKEAWAYS

1. You should have a diversified portfolio of a number of stocks. Diversification protects you from one stock taking a dive. "Don't place all your eggs in one basket."

2. Whether that number of stocks is 20 or 100 or 500 is up to you. We do not recommend three to five stocks, because the number is overly subject to one or two torpedoes, from which you can never recover.

3. Twenty stocks enables you to focus on a lower number to apply your unique insights. While theoretically suggested by Eugene Fama, 100

stocks in your portfolio may be too many for you to follow. And Fama never incorporated intrinsic valuation into his research, much less the automated variety described in *ValuFocus Investing* to reduce Benoit Mandelbrot's stable Paretian alpha peakedness risk.

4. Eventually, we intend to extend ValuFocus to portfolio construction and trading. LCRT will base this extension on empirical validation, as we have always done. It will replace traditional mean-variance.

5. The ValuFocus portfolio construction extension will suggest stocks to add or subtract from your portfolio based on achieving a balance

across all key economic dimensions of intrinsic valuation—size, cash economic return, growth, financial leverage, asset life, asset mix, industry, sector, and so on. It also will suggest when to trade relative to the release of new information and when to rebalance your portfolio.

CHAPTER 20

Advanced Portfolio Concepts

Viewing investing from a value point of view opens up some interesting investing strategies.1 Value investing is a long-term strategy. The movement of a stock price to intrinsic value is a three-to five-year phenomenon.

The strategy needs to be long term. Value investing also is a contrarian strategy. You are buying stocks that are beaten up and selling stocks that have had price success. Psychologically, this is hard for most people to do!

You need confidence that you know more than the crowd knows.

An advantage of ValuFocus is that it allows you to create a set of rules to help you become a disciplined investor. Value investing requires discipline.

1Author's note: All efficient market advocates believe that market timing is impossible—or, in any case, not worth the cost in monitoring time, transaction expenses, or price impact. They recommend that you stay fully invested in widely diversified, CAP-weighted portfolios all the time.

For tactical asset allocation or market timing, I prefer to develop an accurate macro model of country stock price level based on tax rates, tax structures, monetary policy, fiscal policy, country micro structure of property rights, and so on. Absent that monumental research effort, Lee Hayes' insights in this chapter based on his experience in employing ValuFocus during the economic meltdown is definitely worth reading for the wisdom that he shares as a practicing portfolio manager.

Lee Hayes, head of Genesee Investments, is the primary architect of ValuFocus.

We also have named Lee the "resident visionary" of FMA PDDARI, as supported by the CFA Society of Chicago, for his uncanny ability to

bridge silos of thought and link concepts from numerous disciplines. FMA PDDARI is the Practitioner Demand Driven Academic Research Initiative of the Financial Management Association International. PDDARI's purpose is to better link practitioner needs with both academic and practitioner research.

Lee Hayes received important feedback on the contribution of ValuFocus and this book from several members of American Association of Individual Investors (AAII). He wrote this chapter, based on his personal experience and observations as a portfolio manager using ValuFocus on behalf of his clients.

This chapter covers some of the same material as previous chapters, but goes into greater detail.

Before going into specific strategies, let's cover how to select stocks using ValuFocus and diversification.

SELECTING STOCKS

Four considerations are key in selecting stocks as a longer-term investor: value, tracking error, diversification, and inflection points. Each is equally important.

Value and Tracking Error

You want to select a stock that is undervalued—the more undervalued, the better. Undervaluation is relative, influenced by economic and market conditions. In highly valued markets, 15 percent undervalued may be as good as you can get. In low-valued markets, companies can be 50 percent undervalued. Your own portfolio market value often lines up with entire market value.

I like to buy stocks that are at least 35 percent undervalued, with a signed tracking error of less than $+/-$ 15 percent and an absolute tracking error of less than 10 percent. (Please search the index or the text for the arithmetic example of the calculations of signed and absolute tracking errors.) This method provides a value margin of at least 20 percent. I like to buy stocks when the intrinsic value in the past has been both below and above the market price. This means that

the model is working well. I also like to see a 10-year pattern of the intrinsic value often being above the market price.

I like to buy the most undervalued stocks possible, as long as they meet my diversification requirements.

Diversification

Diversification matters in value investing and it matters when using our model. Because the model relies on historic accounting information translated to economics, each industry is unique. We are continually concerned about whether the accounting truly picks up the economics of the business.

We offer some areas of accounting concern. We fear some unique accounting might be at work that our model isn't handling properly when all the businesses in an industry are undervalued or overvalued. Diversification reduces exposure to this problem. Take the automotive industry.[2] It has [2]Please recall that this chapter was written before the U.S. government takeover of GM and Chrysler.

high retirement benefits that are not funded; nor are they all identified in the financial reports. Typically, these benefits are mentioned in a footnote, and then they are not well documented. Age of the workforce and retired workers, along with their life expectancy, usually is not quantified. Benefits also include family healthcare that is not funded. These are substantial liabilities, often adding up to half of the company's value. Before considering these companies for investment, it is wise to dig into the balance sheet and subtract these liabilities from the automated DCF intrinsic value reading.

Many industries have similar concerns: inaccurate value of assets, spin-off of capital-intensive aspects of the business to another company, large quantity of leased assets, litigation exposure, and so on. The easiest way to deal with these issues is to be diversified by industry, and then to buy stocks that have had intrinsic values both above and below the market price. Along the way, read the annual reports to discover what is not being reported. We recommend both.

Inflection Points

We use this term to describe a stock whose market price suddenly

takes a new direction—either up or down. Remember: We analyze history to determine future value. But sometimes history does not tell the whole story.

Still, it is valuable to rely on history. Why? A big reason is that history tends to be reliable, aided by audited annual reports that are significantly more reliable than unaudited quarterly data. Audited information is more reliable than analysts' forecasts and revisions to those forecasts. Turning a company around is difficult, and it often takes six to10 years.

Second: Historical information gives us an accurate baseline to begin our work. An accurate baseline of what has been feasible in the past enables us to better project the future.

Third: We are dedicated to providing a universal approach that is robust. This requires an automated model that deals with every company in a consistent manner. Too often, the investment industry deals with a company by trying to fit the intrinsic value to the market price. This practice is called "plugging the data." Here is a horrible example. Sell-side security analysts view the "fair price" (intrinsic value) as being $5 above the current market price. As the market prices the stock $5 higher, analysts raise the fair price another $5. This continues to happen until the price drops, causing the fair value to slide to $5 above the market price. Investors cannot be successful using this unreliable forecast data. Test the reliability of our perception by looking at 100 companies rated by various sell-side analyst services using this method: Virtually every company has a fair value or target price greater than the current market price. These forecasts are most definitely biased.

We take a different approach. Half of the stocks are overvalued and half are undervalued. We do not plug the data; we calibrate the economic information to determine how the market is valuing future cash flows.

However, there are some things we can't factor into our model. As an investor, you want to weigh their potential impact, because they can become major unfavorable inflection points. Among them:

- Financial data not reported in annual reports.

- Changes in regulations.
- Litigation.
- Instant obsolescence of technology or products (electronic camera/film, videotape/DVD, checks/electronic checking, etc.).
- Retirement liabilities.
- Accounting fraud.
- Drugs coming off patent.
- Oil spills.
- Hurricanes and other natural disasters.

More can be added as you go about analyzing a specific company.

When using ValuFocus, we want to consider these items. For companies with diverse product lines, you can ignore instant obsolescence. ValuFocus handles slow reductions in cash flow due to obsolescence. You need to analyze the news items to seek potential inflection points.

ValuFocus also includes the capability to adjust both forecasted sales and earnings. This allows you to quantify the impact of financial changes on value. We often hear about an event likely to have a long-term impact of 20 percent on the company's earnings. You can model this earnings impact to determine its effect on intrinsic value. Companies are dynamic: They often make operational adjustments to reduce this earnings impact. That is where management comes in. The beauty of ValuFocus is that it allows you to concentrate on what is important, thus serving as a sophisticated value calculator.

Now that you know how to select stocks, we move on to some investment strategies. Following the strategy discussion, we describe how to apply the process to take advantage of high-return, low-risk investing.

Buy and Hold Strategies versus

Selective Market Timing

"Buy and hold" has been undergoing extensive criticism since 2008. As the last 10 years has shown, the long-term stock market return can be zero or even negative. Even so, a value-investing buy and hold

strategy with rebalancing even during this period has provided positive returns.

TABLE 20.1

Typical Asset Allocations

Market	**Cash**	**Bonds**	**Stocks**
Fairly valued market	10%	30%	60%
Undervalued market	10%	20%	70%
Overvalued market	30%	30%	40%

Additionally, we are not ready to abandon the targeted portfolio allocation of 60 percent stocks and 40 percent bonds. This strategy has worked well to reduce risk. There are times to reduce the stock allocation (high-value markets) and the bond allocation (high interest rate or low interest rate with high potential for increased inflation). In

addition, we do recommend substituting low-correlated assets to stocks that provide yield.

However, we do not recommend reducing your stock holding when you retire. Two of your greatest risks involve longevity and purchasing power. Together, they can destroy your retirement more than the loss of investment capital. In 2010, the greatest risk to retirement saving may be low interest rates, high inflation, and long life spans. Bonds do not handle these risks well.

Returns can be enhanced significantly by focusing on high-dividend-yielding stocks and by using a little market timing. By market timing, I mean considering cash as an asset class and increasing your cash position when the market is overvalued. Adjusting your cash allocation based on total market value on a consistent basis provides returns superior to market returns.

Your cash position can vary from 10 percent to 30 percent. To achieve a decent return from this allocation, invest somewhat in near-cash instruments, such as securities with high liquidity and stable prices. Examples include U.S. TIPS, REIT ETFs, Canadian Energy trusts, DIV. ETFs, Preferreds, and government bond ladders. However, you do not want to hold high cash reserves permanently, because your return will be mighty slim, but don't be afraid to hold these high cash positions for short periods.

At the same time, we recommend being equally weighted or intrinsic value weighted, with at least 20 stocks from different industry sectors.

Table 20.1 displays some typical allocations, depending on the current market picture.

Value and diversification dictate your stock selections. In fairly valued and undervalued markets, you may own both Coke and Pepsi. Pepsi is better valued than Coke, but Coke is not significantly overvalued. In an overvalued market, you own only Pepsi; sell Coke if it is in your portfolio.

In an overvalued market, you may want to be holding only 15 stocks, with none of them being in the same industry.

Another strategy is to decrease the number of shares, but keep the

same stock holdings. However, in an overvalued market, it is important to reduce the total intrinsic value of your portfolio. If your portfolio is valued at the market level, reduce it to 90 percent of market.

We know that high-valued stocks3 fall more in a declining stock market than lower-valued stocks.4 Value investing works in a declining market to reduce your losses. In fact, value investing really pays off in many declining markets. In a 30 percent declining market, low-valued stocks (intrinsic value above market price) will decline only 10–15 percent. Often, superior relative returns are the result of reducing losses.

This is a good place to note that in a very good market in which prices rise every day, low-valued stocks (high intrinsic value relative to market price) are laggards. Why? Momentum investors and day-traders rule in these markets. They buy what is moving, building momentum, causing the price to continue to move higher. "Value" stocks are just not attractive to these traders. Value stocks outperform the market when prices are more stable.

You may ask why so much cash? As a value investor, you always are looking for undervalued investments. These opportunities generally come in bunches, when the market has retreated. At this time, you want to use your cash to take advantage of good stock investing opportunities. Then, when the market recovers, you want to sell the highly valued stocks to reinstate 3In traditional nomenclature, "value" stocks mean low price/equity book value or low P/E stocks. This nomenclature confuses us, because we prefer to think of stock prices relative to their intrinsic valuations. As we have observed numerous times, price/equity book values and P/Es are inadequate measures of valuation, because they are not based on cash flow, cash investment in assets, and cash economic returns relative to the investors' discount rate (similar to cost of capital).

4From our perspective, a better way to look at the superior performance of value stocks relates to an economic understanding of the drivers of value. When the stock market declines, the two important drivers are changes in future cash flows or changes in the real discount rate. As discount rates increase, present value arithmetic confirms that low cash flow (low cash economic return stocks) are affected the least, while high CER stocks are affected the most. Since low CER stocks generally have low intrinsic value, market price, price/equity book values, and low P/Es, we now better understand the true economic drivers of the value stock effects during declining

markets.

Of course, when cash flows decline, the actual relative decline of cash flows determines the eventual market price decline in a declining market. So the comment that “value stocks always decline less” is not necessarily true. However, most fast declines in the market are due to discount rate changes, so the previous statement does hold for these types of declines.

your cash position, perhaps using that money to buy some underpriced stocks or to invest temporarily in modest return instruments.

Investing in this way can be frustrating. For long periods of time, you may not find any significantly undervalued stocks. During these long periods, you likely will be selling overvalued stocks frequently. You continually will be worrying about the cash that is piling up, while working to maintain industry diversification. The market will continue to go higher and you will feel that you are missing out. But remember, this is now an overvalued market. You should have more cash—at least 30 percent. Relax.5

Then one day, the market has a serious correction. You now see undervalued stocks. Still, it is a time to be patient. Markets usually don’t fall all in one day. The values of your own stock positions have fallen less than the market, because you have been trimming them for months. However, you do not want to “catch a falling knife.” There are two key questions to answer.

Have we reached a major inflection point that will have long-term impact on the economy and the stock market? Do we have a new normal? Remember: Our models project history forward with the implicit assumption that things don’t change. Declines in company sales, earnings and profit margin obviously affect value!

With ValuFocus as your guide, you can input reduced sales and earnings forecasts as a safety factor and start to nibble on some stocks that are still undervalued, but be careful. During this period, I tend to favor high-yielding large companies, with significant overseas sales to offset any economic problem that may be occurring in the United States.

The time for you to move back into stocks is when the market stabilizes and new financial information comes out. There is no rush. The market will be choppy for a while and ValuFocus will identify for you well in advance the companies that will prosper in the new normal. Companies that are nimble and well managed will prosper in these markets.

They also will increase their value through improving CERs and by adjusting their asset base to become more capital efficient. These improvements take time, and it even takes longer for the market to recognize them.

We may be waiting five years for companies to make the adjustments and another five years for the market to reflect the changes through the stock price. That is why we call this long-term investing.

If this description fits you, then you truly are a contrarian cash-loving value investor. You now have achieved a wide and deep understanding of the fundamental economics that drive stock prices over the long term.

[5]Again, running against the herd is psychologically very difficult to do.

What kind of returns can you expect? Our backtests[6] suggest that you should make a 12 percent to 18 percent per year return on average over 10 years. Your down years should result in negative 5–15 percent returns.

Your up years should generate 8–25 percent returns. Your yield on the portfolio should be about 3.6 percent. You should be up in eight out of 10 years.

PORTFOLIO WEIGHTING

You probably have noticed that we are not very high on CAP weighting a portfolio. Because stock price is both in the numerator and the denominator of this weighting scheme, CAP weighting creates the effect of buying more when the price goes up. As cash-loving contrarians, this is working against our instincts and is supported by our research. We like to buy low and sell high. We do not like to keep buying high and higher until the stock crashes.

We like two portfolio weighting schemes: intrinsic value weighting and equal weighting. Both eliminate buying high. These weighting strategies encourage selling high, because intrinsic value is your major criterion.

We certainly do believe in diversification. An individual stock holding should be no larger than 5 percent of the portfolio on an intrinsic value or equal weighting basis. This maximum 5 percent holding means that you must have more than 20 stocks in your portfolio. If you do not have the time or finances to devote to watching 20 or more stocks, please consider purchasing ETFs or mutual funds. We also strongly recommend industry and sector diversification. Often, particular sectors are highly undervalued.

At the same time, we must avoid value trap industries. We like to select the best undervalued stock in a sector and then move on to the next sector.

Sometimes, one sector stays undervalued for a long time, but rarely does this happen to all sectors.

We are strong advocates of rebalancing our portfolio. Rebalancing makes a major contributor to returns for a cash-loving value investor.

Overweighted positions and sectors should be reduced. You will find that there is never a shortage of undervalued stocks, unless the market is too high, a time when you shouldn't be buying anyway.

We also don't mind holding cash while waiting for opportunities. If this is a problem for you, invest the cash in highly liquid, low-volatility instruments that provide yield. Do not reach for yield by taking undue risk; 6Of course, past returns are no guarantee of future returns.

diversify your cash-like holdings. These investments are temporary. When the market declines, you want these holdings to retain value, providing the money to take advantage of the low market. The strategy in the next section integrates nicely in providing help in rebalancing and putting your cash to work.

ACHIEVING LOW RISK – HIGH RETURN TRADING

While performing extensive backtests, we noticed that, when we view investments from an intrinsic value perspective, the tails of the return distribution achieved lower fat-tailed risk. (Please see Chapter 29, "Producing Lower Fat-Tailed Risk with Higher Returns.") These counterintuitive empirical results do not square with efficient market philosophy. To be specific, we create a return distribution with the horizontal axis being percent over and under intrinsic value. The vertical axis is portfolio equal-weighted return.

We then measure the alpha peakedness (explained in Chapter 29) of the positive and negative tails (top 5 percent of stocks undervalued on the right, bottom 5 percent of stocks overvalued on the left). Both of these tails in the distribution have an alpha peakedness fat-tail risk parameter of 27 —a low-risk normal distribution. The mean of the distribution is positive for the undervalued and the distribution is symmetric. For the overvalued, the mean is slightly positive and symmetric.

In contrast to the low fat-tailed risk observed in the tails, traditional standard deviation measurements were the highest in the tails. Moving from traditional Gaussian normal statistics to Benoit Mandelbrot's heavily researched fat-tailed, stable Paretian8 statistics turned the traditional risk/return results upside down.

In the center of the distribution between 5 percent to 95 percent, the return distribution is not normal. In fact, the alpha peakedness parameter is around 1.5, meaning that it is much more risky than the tails. In this area, 7Alpha peakedness is a measure of Gaussian normal distribution. A value of 2 is normal with nonskewed symmetric tails. These distributions have a stable mean and a stable variance and follow the law of large numbers. What this means is that the "mean" is also the best estimate of the "expected mean" to estimate the future return.

8Stable Paretian is a specific distribution with fat left and right tails. Stock market returns display this type of distribution. What this means to you is that Gaussian statistics tend to seriously under estimate the risk and also to predict a more stable world than actually exists.

there is no variance,9 leaving us to conclude that the traditional

Gaussian risk measures do not exist. What this means to you, as an individual investor, is that there is a free lunch being offered every day. Select stocks from the 5 percent that are undervalued.

We are continuing to research this paradigm-shifting discovery using specific company criteria such as CAP weight, tracking error, plant life, and debt-to-debt capacity to determine what the best criteria are.

A great question arises from this analysis: What is the best strategy to take advantage of this lower fat-tailed risk phenomenon? One appealing strategy is to buy in-the-money calls in the undervalued tail and buy out-of-the money puts in the overvalued tails as specific speculative bets.

We suggest the in-the-money calls and out-of-the money puts strategy to maximize returns, reduce the investment required, and take advantage of the natural tendency of the overvalued and undervalued segments of the market to regress to intrinsic value.

To pay for these calls and puts, you write (sell) out-of-the-money calls and puts (strangle) on stocks that reside in the center of the distribution.

As an additional hedge, these strangles can be in the same industries as the out-of-the-money calls and puts; this eliminates industry effects. You write these options on a portion of your portfolio to enhance returns. We only recommend this portfolio construction strategy if you have previous experience in buying and selling options.

Your purpose is to use the proceeds from selling these options to pay for your long options in the tails. Ideally, 80 percent of your short calls and puts (calls and puts you sold) are worthless when they expire, enhancing your return by 3 to 4 percent. The sold calls and puts should be at a level of 10 percent to 15 percent out of the money. This selling out-of-the-money options strategy relies on markets moving sideways much of the time.

You want 10 percent of your long calls and puts to pay off big—paying for both the other 80 percent of your long option positions and the short options that you bought back for a loss. Your gains hereafter losses should be about 10 percent. This strategy can enhance your returns by 13 percent to 14 percent for a total return of 16 percent to 18 percent, plus your portfolio return.

You can refine this option approach by using the total valuation of the market as a way to weight the strategy in one direction or the other.

When the market is low, buy more calls than puts. Sell puts (after a sell-off) 9When we say no variance, we actually mean the variance is infinite. This means any return is possible, including losing your entire wealth. This also implies there is no stability to returns in the future. No logical expectation can be made.

on stock you own, but hold off on selling your calls until after the rally tiers (legging-in).10 You do not want to have too many puts without their associated calls: Establish these positions slowly as the market cycles from a low to a high. Buy puts only on highly overvalued stocks. In this case, you are anticipating a good return on you long calls and your short puts.

When the market is overvalued, do the reverse. Sell calls first on your portfolio, but wait to sell puts until after the market sell-off. In the tails, buy puts first on overvalued stocks, but refrain from purchasing long calls until a sell-off. The long calls should be on heavily undervalued stocks.

With your core portfolio, eventually, you still want to have sold matching out-of-the-money calls and puts on the same stock.

Why sell out-of- the-money calls and puts on the same stocks? You can collect twice the premium with no additional risk. With the same expiration date on the identical stock, both the call and put can never be in-the-money.

You will win on one or the other—or even possibly both, if the stock stays in a narrow trading range. The short call and put actually reduces risk by protecting each other. Accurate intrinsic valuations from ValuFocus confirm the likelihood of a narrower trading range for the stocks in the middle 60

percent of the distribution of under/over intrinsic valuation.

One final note: Selling calls and puts requires holding additional cash in your portfolio. We do not recommend using margin. Being contrarians, we only want to sell on our terms. Nor do we want to be required to buy an overvalued stock due to a margin call. Thus, we buy with cash, not margin.

SHORTING STOCKS BASED ON VALUE

A natural strategy for value investors is to short stocks. This can especially work for those investors with a good intrinsic valuation model. We do not want to discourage this strategy, but we do want to caution you about a few things. We continually do extensive backtesting. We identify some of the surprises.

■ The upward road to value for undervalued stocks is a long trip, usually taking five years. The trip down to value (overvalued stocks) can be equally as long. Often, the upward ride is steady over the five-year 10Ideally, you want to have a matching short out-of-the-money call with an out-of-the-money put to reduce risk by writing these options at the same time. But you can enhance the premium received and increase the strike price spread by taking advantage of the short-term market cycles. This technique is called "legging in your position."

period, with returns running in the 5 to 10 percent range each year. The trip for overvalued stocks is different. Often, these stocks stay overvalued until a catalyst appears and then they drop dramatically—sometimes catastrophically.

■ Overvalued stocks can stay that way for years, sometimes 10 years, and this length of time can impact returns significantly.

■ Diversification is an interesting debate when considering shorting stocks.

To short stocks, you need to know a lot about these companies and their industry. Thus, a concentrated approach has appeal. Due to infinite possible losses, a short position requires continuous monitoring of the situation (economic performances, news, takeover rumors, government regulation, management changes, sales and earnings forecasts, analyst opinions, etc.). Studies indicate that investors lose money on 80 percent of their shorts, so you must gain on the remaining 20 percent to achieve an adequate return. Shorting also benefits from industry diversification.

■ You may want to bet against the broader market when it is high. When it is low, you may want to eliminate the broader market as much as possible. There are times when you want to remove broader industry movements. A good example: pairs trading, where you buy one stock in an industry and short another in the same industry. It

represents a strategy to eliminate both market and industry trends.

■ Or, you may be trading the economic cycle through cyclical stocks that respond to different timing compared with noncyclical stocks.

Our research has shown that more than intrinsic value must be considered when shorting. A good short strategy must consider timing, technical analysis, an in-depth knowledge of industries and companies, and an understanding of the impact of new information on market price.

A good valuation model only can provide candidates to explore further.

An important ValuFocus helper is Rawley ranges of bounded rationality described around Figure 16.5. These ranges deliver a quantitative measure of "overvaluedness." Some of your best short candidates are stocks above the Rawley range.

Thus, you need to be concerned with value when shorting stocks, but you also must consider timing and how diversified you want your shorts to be. Do you anticipate the general market direction to be in your favor or against you? Do you understand the lead and lag effects of cyclical stocks in relation to the economic cycle? Do you have effective tools to access technical aspects of price movement?

All these dimensions are required to make money shorting stocks. Then, given that you have all these skills and tools, how does shorting stocks fit into an overall portfolio approach? We often hear experts talk about

110/10, 120/20, or 130/30 strategies. What are these strategies? Simply, they represent the ratio of longs to shorts.

Our backtests have shown that the overall value of the market is important in deciding these ratios, along with having a specific strategy.

When the market is high, you should have more shorts and you should diversify more. Why? Because a broad market retrenchment is more likely.

You are not betting against specific stocks as much as you are betting against the market.

When the market is fairly valued, your short strategy relies more on specific overvalued stocks falling in a timely manner. In this case, timing and therefore technical analysis are most important. Most short strategies fail, not in direction, but in timing. In markets fairly valued or trending upward, even overvalued stocks are carried along. This is because most market participants don't know how to assess value. They are trend-following, price-momentum traders.

As an individual investor, you probably can't wait out the institutions, so pick your spots carefully. Select a period when the market appears to be overbought and starting to weaken. Later, when the market has fallen and the prevailing trend is up, remove your shorts, even if your profits are not high. Use what works for your specific strategy, whether you use Fibonacci ratios,11 moving averages, MAC-D, (RSI) relative strength, or composite technical reports from Market Edge.12 Because the market continually changes, certain technical approaches eventually may stop working.

Bottom line: It is easier to make money with short strategies when the market is highly valued and not strongly trending upward. As Warren Buffett has said, "It is easier to see who does not have a swimming suit when the tide goes out." But often, when the tide is out, the market already has declined. The lesson is that you usually have to move earlier, but when to move becomes the issue. Our backtests show intrinsic value alone is not 11This ratio, which is 1.618 (golden ratio), was discovered by Leonardo of Pisa, who wrote *Liber Abaci* (*Book of Calculations*) in 1220. The Fibonacci sequence is a fractal that appears often in nature. Stock market movements at any time scale appear to follow a Fibonacci sequence (.382. .618, .382, 2.618, 4.236). This ratio continues to appear in market price changes and also on time scales for corrections to be completed.

12Technical analysis is the study of price movements and trading volume. The theory is that price and volume movements can predict future price changes. There are many books on this subject that can provide you with the specific calculations.

This technique is highly disputed by academics. They believe price movements are random. Oddly enough, when investors use these techniques, they work. This is a classic self-fulfilling prophecy.

a good enough indicator. We wish it were, but we have to be honest. So far, we have not found any other long-term reliable indicator that demonstrates when shorting pays off. Once you have a strategy, you need to backtest and refine it and then backtest it some more. The backtest needs to cover all market conditions, plus technical timing indicators are critical.

Market sentiment matters. Markets are created by people and people have emotions. We have developed a reliable way to measure this sentiment.

It focuses on the price formation process and further, the interesting research being done in behavioral finance that deals with the rationality of investors.

When using a short-term strategy with large positions, even how you enter and exit the trades is important. We have done extensive testing of these strategies for hedge funds, using our specialized daily backtest tools.

Knowing what you want to accomplish is basic when working a short strategy. Are you trying to reduce your portfolio loss in a down market, or are you trying to generate a positive return in all markets (real return strategy)? These strategies make a real difference in the size of your overall short position.

A short strategy to hedge your portfolio is interesting. To achieve your shorting goal, also consider shorting a market ETF that closely mirrors your portfolio. To avoid taxes, you may want to purchase ETF puts, instead of selling or shorting your low-cost basis stocks. Buying ETF puts is a form of portfolio insurance to use when the market value is high.

The previous section on low risk–high return trading around a core portfolio is a version of this strategy.

A pure short strategy results from simply shorting overvalued stocks that are above the higher Rawley range. This can make sense when your technical analysis and market news indicate a high likelihood of a near-term collapse. To eliminate industry effects, conduct a pair trade strategy—going long in a similar undervalued stock in the same industry.

You can eliminate the entire market direction by shorting overvalued

stocks in overvalued sectors, while “going long” in undervalued stocks in undervalued industries. We are backtesting many of these strategies and will keep you posted on the results.

Shorting strategies should not make up more than 30 percent of your portfolio, unless you have exceptional market timing skills. We have been investing for 40 years and can state with certainty that we do not have these skills. Not many people do. We also can state that these skills require more than just value. Even with good value investing skills moving in the right direction, often the timing is wrong.

That is why our preference is to have a long portfolio in which we sell overvalued stocks and buy undervalued stocks. We may wait years before we fully invest in stocks. Sometimes, we hedge our bets by buying

out of-the-money puts on some of our holdings or out-of-the-money calls on others. We often reinvest by selling out-of-the money puts to acquire stocks. If the puts are in the money at expiration, we take the stock and sell out-of-the-money calls when we can get a 20 percent return because of the positive spread between the intrinsic valuation and the price at option expiration.

By investing in this manner, we are not so dependent on timing.

In fact, we call this the cash generator. The cash generator reliably can generate returns in the 15 percent to 20 percent range, while avoiding transaction/price impact costs to acquire the stock.

CASH GENERATOR

The cash generator combines value investing, portfolio rebalancing, and timing issues within a complete system. It focuses on enabling individual investors to buy low and sell high, while maintaining a diversified core portfolio. Institutions trading in high volumes likely cannot execute this strategy because of the severe liquidity price impact costs in the put and call markets. Thus, the cash generator is ideal for sophisticated, knowledgeable individual investors like you.

Much of the foundation of the strategy was developed by putting into practice the concepts described in two books by Harrison Roth[13] and by Tony Plummer[14] covering value investing and portfolio

management.

Reading these books will help you implement this strategy. Plus, ValuFocus becomes a prime implementation tool. Roth provides all the basics of leap options; they are the primary option you will use. Plummer provides an excellent understanding of the importance of sentiment, plus insights into how individual stocks and the market tend to fluctuate. The cash generator takes advantage of these fluctuations or cycles.

The basic principles are easy to comprehend. We start by explaining the principles and offering an implementation example. By getting the direction right, but not the timing, we buy more time by buying and selling stocks using options. Let's say we purchased an undervalued stock, which now appears overpriced, based on our ValuFocus intrinsic valuation. Either the price rose or the intrinsic valuation resulting from new financial information fell. Now the stock appears overvalued, so rather than sell the stock, we sell 13Harrison Roth, *LEAPS: Long-Term Equity Anticipation Securities: What They Are and How to Use Them for Profit and Protection* (Richard D. Irwin, 1994).

14Tony Plummer, *The Psychology of Technical Analysis*, 2nd ed. (Irwin Professional Publishing, 1993).

out-of-the-money or at-the-money calls to hedge our bet. When the stock appears not to rise any further, we buy back our calls at a profit and sell the stock. Or, if the stock continues to rise, we allow the call to be exercised as our stock sale or roll the call higher, preserving our cash. (Exercising the stock sale constitutes buying the call back and rewriting it at a higher stock price to gain more time. We roll the call higher up and out.) To help hedge this situation, we also can write (sell) an out-of-the-money put on the same stock with the same expiration date. We will be collecting twice the premium with about the same risk—the risk involving exercising either the call or put. How do we know when to do this? We use ValuFocus and technical analysis. We consider doing this only when the stock price is 10 percent above the intrinsic value. We definitely do it if the stock price gets up to the higher Rawley range. At that point, we are less concerned about what the technical analysis tells us.

You may be confused; an example will help. A good stock for this

strategy is Praxair (PX). Our time frame is September 2010.

The stock closed on 9/9/2010 at $86.69/share, with an intrinsic value estimate of $78 share. The upper Rawley range of the stock is $98 a share and the lower Rawley range is $55 a share. The stock has traded between $89.74 and $72.70 for the last year, with the high reached on 4/26/2010

and the low on 5/21/2010. Since August, the stock has not been able to break above $89.14/share. Is the stock at a top? If you use Fibonacci ratios, the stock is in the consolidation phase of the first major cycle up (wave six to eight).

While this consolidation phase can have a 30 percent to 50 percent retrenchment, the stock is barely moving down and is staying between $85

and $87. The stock also is not at the upper Rawley range, leaving no clear answer on where it is going. In this last major wave, the stock moved up $12, but the price could easily retrace to $83 before starting its next upward leg. To add confusion to the analysis, the economy is weak, with high unemployment, and there is talk of a double dip from the crash in 2008. We do not know at this time whether we are in a bull or a bear market. Adding confusion at this time is the upcoming major U.S. Congressional election.

This is the real world of investing. My instincts tell me to wait until after the election, because currently the sentiment for the entire market is negative due to political uncertainty. However, here is a compromise strategy using techniques in the cash generator.

Keep the stock and sell a January 2012 $100 call at $5.15. This call strike currently is $7 ($105 − $98) above the top Rawley range and 21

percent ($105.15/$86.69) above the current price. We must point out here that Rawley ranges do change based on company performance, trading volume, and the stock market price. In 2012, the range may be $120, but

at least you are close. Remember that you don't have a problem until the market price is higher than $105. Above $105, you lose the

opportunity of selling at the higher price, as the call owner takes your stock away.

As an additional hedge, after the election when PX starts to move up to start a new Fibonacci cycle, you can sell out-of-the-money puts. The January 2012 \$60 put is \$3.30. This helps protect your call. The \$60 put strike also is below the lower Rawley range. Remember, the call and put both provide mutual protection.

You have now committed to sell the stock at \$108.45 (\$100 + \$5.15 + \$3.30) and to buy the stock at \$51.55 (\$60 − \$5.15 − \$3.30). You should take these actions, regardless of what happens, and move on to something else. Leave this position alone, unless you can buy the calls or puts back for 15 cents. If you can do that, consider rewriting out-of-the-money options.

Exercise any option in the money at expiration if the fundamentals have not changed. This is a buy low, sell high strategy. If you sell the stock but like the company and it is no longer overvalued, sell an out-of-the-money put.

What if the stock sells off after the election? Wait on selling puts until the stock stabilizes. You will get a greater premium for the put or lower your strike to 50, or both. This position is even better, but there is an unrealized loss on the stock. Often, the calls and puts do not fully cover this loss (usually only 50 percent). Still, as a value investor, you keep undervalued stocks and PX probably will be undervalued. The company also pays a 2 percent annual dividend. This helps your return and supports PX's market price.

You now have seen a real-life example of how to sell a position and commit to increase a position. Of course, whether we sell or buy Praxair is not only based on its intrinsic value, but also its weight in the portfolio. If we own too much PX, we will be writing calls closer to the money and our puts will be farther out of the money. We will have greater interest in selling if there are better opportunities. We must also consider our cash position.

Do we need more cash? If yes, then we will be more aggressive sellers of PX. Of course, as our wealth increases, our position size increases. If PX continues to be undervalued and we own a reasonable amount (5.5 percent of the total portfolio), we can afford to take our time and

continue to write calls. If the return is between 10 percent to 15 percent a year on PX, as an investor I am happy![15]

15A sophisticated academic, who strongly believes in perfectly efficient markets, naturally will ask how a strategy like the cash generator can achieve such positive results with lower risk. It is true that out-of-the-money options trade at higher prices than predicted by the Black-Scholes option pricing model. This apparently (*Continued*)

The last item in the strategy is how to buy stocks. Being a value investor, we like to buy undervalued stocks with upward momentum at the cheapest price possible. I have found selling out-of-the-money puts is perfect for this.

It creates the discipline necessary to buy low or to verify your selection of positive momentum stocks. How is this? One of two things happens: You (*Note Continued*)

anomalous effect is called the "volatility smile." This option pricing model relies on the Gaussian normal distribution assumption to produce its results. These higher prices will, on the surface, increase the positive results contemplated in the cash generator results. But this is not true. Out-of-the-money calls and puts need higher prices to compensate for fat-tail risk in general. There could be some returns coming from mispricing of these options. However, the excess return is probably due to the fact that the overvalued/undervalued tails have lower risk. Our research has indicated that the tails when looked at through the value lens are actually Gaussian normal distributions.

Incidentally, Stanley Hales, while working under Huston McCulloch at The Ohio State University, demonstrated that the "volatility smile" anomaly evaporates if the standard Gaussian normal assumption in Black-Scholes is replaced by Benoit Mandelbrot's heavily researched stable Paretian distribution with empirically validated fat-tails. Please see Hales's unpublished paper (contact Rawley@LCRT.com

for a copy), "Valuing Foreign Currency Options with the Paretian Stable Option Pricing Model." These results provide additional strong empirical evidence of the importance of using Mandelbrot's research to measure risk accurately in observed distributions.

Option theory does not incorporate intrinsic value, and this is your

edge.

Because intrinsic value is not considered in the option pricing models, overvalued stocks have options that are overvalued and you are selling these options. With undervalued stocks, the puts tend to be overvalued and also are selling these options.

This strategy will work as long as stock market prices tend to move toward intrinsic value over time. For investment in this cash generator strategy, remember that you need accurate intrinsic values with operationally stable companies (companies with positive CER trends). Conventional theory states future stock prices are a random distribution around current stock price. We suggest that intrinsic value may be a better anchor to employ in option pricing models.

In our comments on current research, we mentioned higher returns with lower risk by investing in the over/undervalued tails. Surprisingly, we found in this same study that returns in the center of the value distribution were not normal, but fat-tailed. We are still investigating whether you are receiving the proper value for your options in this middle area. We also know stable CER is important with fair value stocks to have the cash generator produce superior returns.

In addition, because of liquidity constraints in the options market, institutions are prevented from executing the cash generator with sufficient volume to force market efficiency. That institutional liquidity constraint can work in your favor as an individual investor.

are right about how low a stock can go, and you have the momentum right.

The put is worthless at expiration, and you make 10 percent on your money, but you do not get the stock. There are stocks I have tried to acquire for over two years. To deal with this situation, I have developed an alternate strategy. It is the second thing that can happen. You are wrong, the stock drops farther, you are in the money, and the momentum is negative.

The first problem is frustrating, but it is the nicer problem to have.

In his book on psychology, Plummer states that stocks always cycle up

and down. They never go straight down or straight up. Thus, if your puts continue to be worthless at expiration, on the bottom of the next down cycle, buy the stock and sell out-of-the-money puts. This should happen at the start of a new Fibonacci cycle (one wave). When this wave ends, sell out-of-the-money calls. I call this the "dating phase" when you are getting to know the stock. Your beginning positions are small—usually 200 shares. If the stock is called away, take your gains and start over. If your put is exercised, take your stock, but closely revisit your assumptions on the company's intrinsic valuation. Is this stock still truly undervalued?

Has anything changed? From an operational perspective, is the company increasing its cash economic performance? What you don't want is a

"value trap" (a stock that continually goes lower). If future cash economic performance is more likely to decline further, admit your error, sell your stock, and move on to another company.

Now your out-of-the-money put is in the money. You wanted this to happen, but only if the stock continues to be undervalued and is showing operational improvement in its future cash economic return. Once again you are trying to avoid a value trap. It's fine if the market has not yet recognized the value, but make sure that something negative hasn't happened. We mentioned early that sometimes it takes years for the market to recognize value, and as a contrarian, you are patient.

At this point, there are three options.

1. Verify all your intrinsic valuation assumptions and take the stock. When doing this, you can write an out-of-the-money put that is lower. To hedge your bet, sell an out-of-the-money call. Seek a 20 percent return if the stock is called away.

2. Verify your investment assumptions and buy back the put at a loss to re-write an out-of-the-money put. Do this if you cannot get a 20 percent return on option one, but still like the stock.

3. If you think that future cash economic returns will likely decline, buy the put at a loss and move on to something else.

This completes our rough outline of the cash generator. During stable rising markets, you can continue to execute this strategy. In really good

markets (30 percent gains a year), you probably will give up some of that return, but you will have less risk; your return may be 25 percent. During normal markets yielding 6 percent to 15 percent returns, you should gain about 20 percent.

The real risk in this strategy occurs in significant down markets. Avoid having short puts in these markets. The calls will reduce your losses, but the puts can kill you.

We offer three general rules to follow.

1. In a strong upward trending market, write fewer calls. All the calls should be out-of-the-money. Write puts to protect your calls, but do not try to acquire additional stock, unless the market is undervalued.

2. If a strong market appears to be weakening, reduce your short puts and prepare for a sell-off. Retrenchments are usually 30–50 percent.

Patiently wait for this retrenchment before selling puts. The market can stay in this range for a long time, so stay patient. Stocks do not go up in a straight line. For the market to go forward, momentum traders have to give up and value investors have to enter. As we know, value investors will not buy at this level. Value investors want greater bargains.

3. In a downward trending market, write at-the-money calls at near-term highs. Do not write puts until the market is at bottom. Be patient.

Bottoms take years in down markets. Wait for positive signs of a bull market. Bull market confirmation requires at least two up cycles with retrenchments before writing puts (this is called putting in a bottom). Feel free to bottom fish with out-of-the-money puts if you find undervalued stocks with good cash economic performance, but remember your intentions are to acquire the stock. Down markets always go lower than we expect.

Of all the ideas that we have outlined, the cash generator is the best long-term strategy. It is a risk-reducing strategy, but it requires a lot of work and a contrarian bent. A cash-loving contrarian bent.

KEY TAKEAWAYS

1. Buy stocks that are 35 percent undervalued, have a signed tracking error of less than +/− 15 percent, and have an absolute tracking error of 10 percent or less.

2. Diversify across industries, usually holding less than 5 percent in any one company.

3. Use your insightful forecasts to identify company inflection points based on future cash economic returns improvement.

4. With the economic meltdown, simple buy and hold strategies are under severe questioning. Only more active investing will likely conserve and increase retirement savings.

5. Depending on psychological sentiment for the entire market, adjust your mix among cash, bonds, and stock.

6. Employ equal weighting or intrinsic value weighting instead of CAP

weighting.

7. Consider purchasing call options from the tail of most undervalued stocks and purchasing put options from the tail of most overvalued stocks. Fund these option purchases from the middle part of the under/overvaluation distribution by selling or writing covered puts and calls.

8. Selling short is a good strategy, but requires more in-depth knowledge of the firm and close analysis of market sentiment to get the timing right.

9. The cash generator strategy extends the use of puts and calls to buy lower and sell higher. It also requires extensive use of market sentiment and technical indicators.

CHAPTER 21

What If You Don't Want to Employ ValuFocus

What if you just don't want to employ ValuFocus?

You just don't wish to spend the money. (The subscription cost from your broker or LCRT is quite reasonable, providing value for the money.) Or you're an engineer . . . or an academic . . . or a student, and you just want to know what's in the black box, so you can trust it.

You like to perform your own research and analysis.

This chapter provides a free way to download Excel teaching software from LCRT. Then, you can copy data from Yahoo Finance or some other source to enter into the spreadsheet to see how the calculations are made, or to add your own.

This chapter provides a way to fit these needs of detailed analysis.

Since I am a "nerd," we call this intrinsic value stock selection for nerds.

In this LCRT Excel sheet, we provide some of the standard valuation models that we have tested extensively so you can see the results and the detailed audit trails that produce them.

Of course, we do need to earn a living. So, we have not included in this software our most advanced models and the parameters' estimation process necessary to assure that 50 percent of the universe is undervalued and 50

percent is overvalued. Please forgive us.

We give you six steps on what you need to do.

1. Download the Excel software from the LCRT web site: http://www.

ValuFocus.com.

2. Pick a source of data—say, Yahoo Finance.

3. Download the data:

■ Fundamental data—income statement, balance sheet, sources and uses of cash.

■ Price data.

■ Analyst estimate data.

4. Copy the data into the Excel software.

5. LCRT uses the chart of account titles to map the data into the spreadsheet.

6. Review the results. Since Excel is self-documenting, you should be all set.

After this experience of reviewing one company at a time, you may decide your time is more valuable. You can download, import, review, and summarize many companies automatically. Reconsider ValuFocus. Or you may decide that this is a neat way to test your own models and theories. We have suggested a most rigorous research process for your testing.

CHAPTER 22

Always Going Forward

Our process (and this book) provides first a set of investing principles.

These principles then give you the flexibility to apply any model or a combination of models. Finally, we offer a range of application tools. We want to convince you to use our LCRT modeling. But you can use one of the dividend discount models (DDM) or an economic value-added (EVA) model or a cash flow return on investment (CFROI) model. You can choose the data source(s) you prefer.

We believe our structure serves as the foundation that also includes all the details. We want you to rely primarily on what we are giving you, because we have done all the really hard work. We hope that you agree. For you as an individual investor, and, indeed, for you even as a professional, it is both extremely expensive and time consuming to replicate what we have done already. Our premise is proven by the results. We know of investment banks that have spent millions of dollars trying to build the kind of models we have here. Yet, they ended up with little of value.

The LCRT modeling process is not about providing one calculation or another. It is an entire framework that combines all the insight and information that can be made into a cohesive way of studying the investment market, making smart buy/hold/sell decisions, and

managing your portfolio.

Yes, cash flow modeling has lost out to earnings-built multifactor modeling until now, but we continue to advance our cash economic return model in efforts to convince more and more of the market's players that it represents a superior methodology.

At the same time, we continue to conduct serious research into building this better way to invest in stocks. We believe strongly in our cash economic return methodology, and we are working hard to improve it. At this time, we are working on the premise of a combination of models, testing each with real stocks to see which works best. This is the focus of our work going forward.

Our going-forward research and practice effort builds from our intrinsic value model. We overlay analyst research, a grounded rationality model of 223

stable Paretian distribution to cover risk, and multifactors to cover the noise. It is a new price formation process.

We are, in effect, overlaying active labor intensive work (analyst research and multifactor modeling) on top of an automated discounted cash flow model. The key is finding a way to integrate active sell-and buy-side (analyst and investment manager) research and insight covering the company. To these insights, add industry and important macro considerations on top of the automated DCF model.

Why is our methodology the best available in the entire world of stock market modeling? Our key is to incorporate the principles of robustness, accuracy, nonbias, and predictability in calculating the intrinsic value of a company as the basis to make buy and sell decisions in managing your portfolio. We add ranges of bounded rationality to quantitatively model market overreaction and determine likely price inflection points.

That doesn't mean we are done, either. Our life's mission has been to build this modeling process, and it continues.

Public policy changes motivate us to encourage you to give serious consideration to the thesis and investing methodology laid out in this book. For decades now, public policy has been turning over to you the

responsibility for managing your finances. Self-directed investment plans are becoming the way of life. Witness the growth of 401(k) and other self-directed plans replacing corporate and public pension programs. You have the obligation and opportunity to manage your finances yourself. This book provides the path. Our ValuFocus provides a tool to simplify the way.

Perhaps it takes the kind of crisis we have gone through in 2008–2009, which is continuing, to get people to recognize the flaws in current investment thinking and specifically the use of earnings as the prime metric.

The subprime mortgage mess dramatically shows the problem of using the wrong metric. You can't transform a single C-rated subprime mortgage into a single A rating, no matter how broad the geographical diversification.

Verifying borrowers' income/cash flow is an absolute prerequisite to lending money. The lesson: Cash flow is what matters.

During this difficult time, the market is not being driven by fundamentals. Instead, it is being driven by momentum, price change, fear, overcon-fidence, uncertainty. Earnings are failing at this time because they are not a good way to measure a company's performance. The utterly simplistic models used by the market are failing. The right answer is cash flow.

The market has been driven by daily and hourly price change based mostly on macro events, not fundamentals.

As a result, there has been extensive market overreaction. The market continues to overreact until it reaches the range of bounded rationality.

Then, it reverses course.

The holy grail for the investment process as well as for corporate finance is to know and recognize the limits. Research on price movement shows that prices tend to follow their momentum over a year and then reverse course.1

But they don't know when the inflection point is occurring. The

market and its disciples can't tell us that, because they are in the price change silo and thus are oblivious to what is happening with the fundamentals and with intrinsic values that reflect price levels.

Our process helps discipline you to focus on what really is important.

We view it this way: Understand the cash flows generated by the business and how those funds translate into performance in a competitive environment.

It is useful to understand that companies are not just competing for market share. They also are competing for capital.

Information is the critical component of all this analysis. We are working to improve the LCRT models by applying information daily to intrinsic value calculations. That information changes those calculations.

Change triggers portfolio rebalancing. The change can be in the price of the stock and/or it can be in the intrinsic value. Information driving market behavior mainly changes the price. New fundamental data changes the intrinsic value calculation.

We are moving toward being able to update information serving the model more frequently, hopefully quarterly, and eventually, maybe even daily. We also are working to add analyst overlays—their research, buy/hold/sell recommendations, performance forecasts, and guidance. To wit: We will incorporate changes in estimates. You will be immensely more sophisticated in working our LCRT model when you have these added capabilities.

Critical information? Let's focus on the value of analyst research. For us, it is not the analysts' assumptions of terminal value. Terminal value estimates are so sensitive to inputs (that can occur continually) that analyst assumptions may add "noise" rather than insights and accuracy to the valuation process.

Analysts tend to focus on quarterly performance. In so doing, they are playing to a market that has a sizable and possibly growing intent on trading to capture short-term profits and avoid/reduce losses. Programmed high-frequency trading, responsible for the recent "flash crash" in May 2010, represents this tactical approach. Analysts tend to limit any longer 1Narasimhan Jagadeesh and Sheritan Titman, "Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency," *Journal of Finance*, Vol.

XLVIII, No. 1, March 1993, pp. 65–91; and “Profitability of Momentum Strategies: An Evaluation of Alternative Explanation,” *Journal of Finance*, Vol. LVI, No. 2, April 2001, pp. 699–720.

forecasts to a year or two. Then, they put a terminal value on the end of those forecasts. But, because of their widespread degrees of freedom, they can create almost any terminal value number they want.

Randall Schostag describes this reality in his *Valuation Handbook* (Wiley), Chapter 15, “Portfolio Valuation: Challenges and Opportunities Using Automation.” In it, Randy writes that because of the degrees of freedom they control, analysts can create literally any stock price or intrinsic value from their forecasts. Is that adding insight, accuracy, and predictive capability to the process? I’m skeptical.

The true value-added of analyst research comes from the new insights they provide. This research is incorporated into their quarterly, annual, and two-or three-year forecasts. The research they do enables the analysts and investors—yes, you—to pick up on the inflection points as they are occurring or maybe even a little ahead of time. Our highly disciplined LCRT model basically works from historical data in identifying inflection points and changes in intrinsic values. Therefore, it won’t pick up the critical information and insights reported in the research and forecasts of the analysts.

Recent events have made the important difference between historical and contemporary information even more dramatic. Financial statements from investment and commercial banks, other financial institutions, and corporations taught us that history isn’t always that useful. But the analysts are on top of all that. At least, they should be. Thus, we want to combine the best insights from an automated structural basis, namely, our LCRT modeling, with what the analysts can do better than any automated approach. The analysts and smart investors can help us understand how changes in macro drivers and changes in economic, industry, and company conditions will impact performance and create inflection points that move intrinsic values and stock prices.

We envision a comprehensive LCRT modeling process containing two

complementary lines: solid analyst research as an overlay on top of the intrinsic values derived from pure history.

Imagine a value chart. It shows a company's intrinsic value with ranges of bounded rationality. Think of it as the spread between high and low valuation.

Then imagine a series of check-off boxes to reach each source of analyst information. Click on one of the boxes. The analyst source immediately shows intrinsic valuation above or below the ones derived from purely historical information. Tracking errors compare the accuracy of the analyst source with that same statistic from the purely historical information.

The comprehensive array of analyst sources might include Standard & Poor's, Starmine, Abacus Analytics, Thomson-Reuters, Zacks—or even the

output of a particular analyst. Let's say we have available to you in our model a list of analyst estimates and research from supplier firms and the ability to access a specific analyst. You just click on what you want and are able to immediately visualize the effect of that research on the intrinsic value.

You are using the analysts' research and forecasting, not the terminal value assumptions or price targets. We intend to incorporate all this capability into our ValuFocus system.

Our LCRT modeling process offers plenty of flexibility to satisfy the individuality of individuals. Each of us applies our own knowledge, experience, investing strategy, available time, and other factors to managing our portfolios. Fortunately, our model accommodates all this diversity. You can use a growth or value or other investing approach and access data from a host of specific suppliers with analysts' insightful forecasts as overlays.

We are describing here the two basic markets of ideas. There is the academic part of the investment communities' market of ideas, focused on price change, and our part of the investment practitioners' market of ideas, focused on price levels. The trouble with this 2 X 2 matrix, illustrated in Figure 22.1, is that the participants of the two schools aren't talking to each other. They are not collaborating to

"think outside the box."

We want to change that.

Our challenge is to convince investors—to convince you that it is the company cash fundamentals that should matter and do matter. This is a tough challenge at times when the market is being heavily influenced by the macro factors and is being driven by momentum.

We certainly acknowledge that macro factors constitute a portion of the market. Many of the key drivers of the market really don't conflict with each other; they represent various points of view.[2]

Price Change

Price Level

?

Academic

Academic Price Change

Academic Price Level

Practitioner

Practitioner Price Change

Practitioner Price Level

FIGURE 22.1

Silos Who Do Not Communicate

2Academics would call these "various points of view" the heterogeneity of investors.

Academics also are fond of making the simplifying assumption of homogeneous investors. In our view, relaxing "homogeneity" is crucial to developing a more realistic theory and deeper understanding of the market and its differing participants.

Our common sense tells us if you are going to buy the market, why not focus on the undervalued part? Our method enables investors to do that and still have good market representation. We can offer all the diversification you may want.

Or, if you are determined to focus on growth stocks, indicating high growth rates, buy the ones that currently are undervalued.

Value investors may have the strongest commitment to their philosophy, maintaining a religious-like belief that undervalued stocks consistently or eventually outperform the market. There is some study to show this, but it is not complete. We are working on that.

Thus, the belief goes, value investing is winning investment. The belief relies strongly on regression of the price toward the mean intrinsic valuation.

Our research to date does support the theory of value, namely, that prices migrate toward value. As stocks regress to the mean, there is a lower risk in buying them. They should produce higher return at lower risk. This refutes the notion of the grand trade-off: The only way to get higher returns is to take on higher risk.

For firms with cash economic returns greater than the investors' discount rate, an undervalued company that is growing should produce a higher return than an undervalued company that is not growing. Conversely, for a mature company with cash economic returns less than the investors'

discount rate, the company is growing too fast and may become overvalued.

This mature company needs to restructure to raise its cash economic returns before growing.

Regression to the mean moves both ways: Overvalued stocks will decline to value and undervalued stocks will rise to fair value.

Thus, we have two major purposes in writing this book.

One is to encourage investors to adopt our methodology and model because we are convinced that we offer the most accurate process to value the securities of a company.

The second is to encourage investors and academics to adopt our methodology and work at improving it even further. We would be

thrilled to have the market move away from earnings as the main value driver to favoring cash flow instead. Let us rightfully move from using an accounting measure to using a real economic measure based on cash.

We welcome good input from investment experts. We are glad to incorporate the best of these improvements into our LCRT modeling. We are trying to create opportunity for the ongoing development of improved economic, cash-based investment modeling. We are only too glad to incorporate new insights into our modeling process as we learn about them.

KEY TAKEAWAYS

1. Policy changes, especially with Social Security, strongly encourage individuals to undertake much greater responsibility for their savings and investments.

2. *ValuFocus Investing* provides the framework and ValuFocus delivers the tools to actively accept this greater responsibility to manage your savings and investments.

3. Eventually, we plan to incorporate analysts' insightful forecasts from industry competitive analysis, overlaid on top of LCRT's ValuFocus intrinsic valuations, to give you one more information advantage against less knowledgeable investors and traders. Our continuing research into a new price formation process will cover analyst research, bounded rationality to cover risk, and multifactors to cover the noise.

4. We would love to incorporate your insights from using ValuFocus into the LCRT cash-based economic framework.

CHAPTER 23

It Is Time to Get Started

All the forces seem to be against us. The stock market itself seems unjustifiably powerful. It sometimes even drives the economics of our society. It has misplaced influence on the biggest, most important macro decisions of our economic and political leaders.

We are dealing with decades of practice. Dozens and dozens of books.

Overwhelming media coverage. They all say this is the way. Rely on earnings.

Invest on the basis of price and market movement. Be safe: Follow the crowd or bet on an index. We can go on.

How can we possibly change minds? Even more challenging, how can we change standard practices? How can we get the thousands of very intelligent, committed believers of their ways, shown to be best in their minds, to consider something else?

The answer: through you; through each of you using our process as your way of investing in stocks.

You become the new force.

We are patient. We know it will take a while. Maybe others will be persuaded enough to follow this lead. Surely, if they do that, they will make further improvements. An army of investors and scholars continuing to make improvements will bring a much better process than we have today.

We welcome their participation.

We seek one convert at a time, trying our process and seeing its value.

It is better than standard practices.

Stock prices should be based on the economics of a business—on cash, not accounting methods.

This is the right time to take a long look at another way. The experiences of 2008 and 2009, and continuing, should be incentive enough to seek a better process. It is time to get started.

Section

Six

Advanced Topics for

Practicing

Professionals

Portfolio managers, security analysts, CFA charterholders, financial advisors, financial analysts, financial modelers, educators, and those eager to learn more:

We wrote this section on advanced topics for practicing professionals and those eager to learn more. It is written in a concise and technical style. It should be fun to read for those of you who love their trade and wish to consider potential improvements. We also want to encourage every individual investor reading this book to dig into these chapters. There is much here for you to add to what has been presented thus far.

This section answers questions often raised about the LCRT framework.

We want to be as complete as possible—all in one place. This section, along with the one addressed to academics that follows, is specifically designed to add credibility to the LCRT framework from influential people in the profession. The LCRT framework includes paradigm-shifting theory, extensive supporting empirical research, and the ValuFocus practical application tool to make it all useable for individual investors.

Buying, selling, or shorting stocks ought to be simple. Buy stocks whose price is below their intrinsic value. Sell or short stocks whose price exceeds the intrinsic value. All the complexity ought to be under the hood—like driving a car.

ADVANCED TOPICS FOR PRACTICING PROFESSIONALS

Chapter 24: Security Analysis and Modeling

1. As a security analyst, you may learn much from *ValuFocus Investing*:

■ Empirically validate your terminal valuations with historical data.

■ Employ an Analyst Dashboard to simultaneously view your company's value chart, baseline historical data, model parameters, and forecast assumptions. Instantly view the intrinsic value effect of changing your forecast assumptions and overriding historical calculations to better reflect the business cash economics.

2. As a financial modeler, you can link intrinsic valuation anchors to your multifactor and technical research to create price formation models at the month, week, day, and hour levels.

Chapter 25: Wealth Management

Charts that measure the intrinsic valuation characteristics of portfolios can prove a most effective way for you as a wealth manager to communicate with your clients.

Chapter 26: Portfolio Construction

Concentration ratios may be much better than traditional mean variance for measuring portfolio diversification. Most great meltdowns occurred in portfolios with too great a set of concentrations in particular stocks, industries, or sectors. The great meltdown in 2007–2009 concentrated in the home mortgage sector, with no verification of borrower's income, induced by government policy to encourage home ownership.

CHAPTER 24

Security Analysis and Modeling

Security analysts work with valuation measures all the time. So, what's new in this book to help you, as a security analyst, perform your tasks better?

EMPIRICALLY TEST TERMINAL VALUATION MODEL

AGAINST HISTORY

First and foremost, all valuation methods have a terminal value assumption that often is not explicit. We suggest (actually strongly recommend) that you explicitly define your terminal valuation assumptions and empirically test these terminal valuation assumptions or model against history. We make this recommendation because terminal valuations typically are such a large part of current intrinsic valuations. From our experience, terminal valuations typically range from 75 percent to 95 percent of the current intrinsic valuations with two-to five-year forecasts. Excellent references on several models are provided in Chapter 11, "Suppose You Love Your Current DCF Model."

These empirical tests can measure the core characteristics of your terminal valuation model across the universe of stocks for a decade or more.

We recommend these tests to help assure that your terminal valuations are robust, accurate, and unbiased. Accurate, unbiased models tend to achieve both lower risk in a fat-tailed sense and are more predictive of future price movements. That's quite a combination, we might add.

1. Robustness. For how many companies does your terminal valuation model not calculate a value? Why? What percentage of the entire universe does that number represent? For a simplistic example, if your model relies on dividends or earnings and either of these numbers is zero or negative, how can your model calculate an intrinsic valuation? Can you move to a more comprehensive model that nearly always calculates an intrinsic valuation?

2. Accuracy. When measured against historical prices for many years, how close are your intrinsic valuations to actual market prices? What

are the signed tracking errors? (Please search the index or the text for an illustrative arithmetic example of the calculations for tracking error concepts.) Is the model consistently biased above or below actual prices?

What are the absolute tracking errors? How do those tracking errors compare with other models?

3. Nonbias. Do any of your terminal valuation driver variables significantly bias the intrinsic valuation? If so, what can you do to eliminate the bias and make the model more accurate, and therefore, more predictive of future price movements? For example, Figure 30.6 shows that CAPM

beta biases DDM models. Setting CAPM beta to 1.00 eliminates the bias, improves the accuracy, and makes the intrinsic valuation model more predictive of future price movements.

4. Predictive. Do actual prices migrate toward the historical annual intrinsic valuations, based on your terminal valuation model? Can your terminal valuation model, applied purely to history, produce annual intrinsic percent under- (over-) valuations that monotonically predict future price movements—high to low? Does this monotonic pattern continue if you oversample the tails—say, $<$ 1 percent, 1–5 percent, 5–10 percent, 10–20 percent, 80–90 percent, 90–95 percent, 95–99

percent, $>$ 99 percent? Can you detect any bias patterns in your terminal valuation model's annual outliers?

5. Risk. Compare both the fat-tail risk and traditional Gaussian normal risk measures for under-and overvalued firms. Do these two risk measures suggest the same conclusion, or does fat-tailed risk provide the opposite conclusion from the normal risk measures? As you make improvements to your terminal valuation model, do its risk characteristics improve?

Compare your model's characteristics against other models along these graphical dimensions, since a picture is "worth a thousand words." We use these charts to provide examples of these graphical comparisons.

■ Figure 27.2 Comparing Three Models

■ Figure 29.3 Standard Deviation of Returns of Overvalued and Undervalued Securities—Panel Data

■ Figure 29.4 Alpha Peakedness Parameters of Overvalued and Undervalued Securities—Panel Data

■ Figure 30.1 More Accurate and Less Accurate Models

■ Figure 30.2 Accurate and Robustness in Models

■ Figure 30.4 Return Versus Under- (Over-) Valuation

■ Figure 30.6 Under- (Over-) Valuation and Beta

■ Figure 30.9 Returns for Three Models

Three chapters cover research methods for accomplishing refinements of your terminal valuations.

Chapter 27: Another Tour through Our LCRT Model Chapter 29: Producing Lower Fat-Tailed Risk with Higher Returns Chapter 30: Comparing Our Model against Three Popular DDMs These chapters also provide ideas for how best to translate traditional terminal valuation models into single-period models applicable to historical data for empirical testing. With this extensive empirical research, you now have a good terminal valuation model. It should achieve lower fat-tailed risk and higher returns—the best of all possible worlds.

BENEFITS AND REWARDS

If this seems like a lot of work, candidly, it is. However, we think that the rewards of objectively measuring what risk/return results your

termination valuation models achieve definitely is worth the effort. Biased, inaccurate valuation models produce higher risk and lower returns, according to our extensive empirical, but admittedly always improving, research.

ANALYST DASHBOARD

Now you want to employ your enhanced terminal valuation model in your traditional security analysis. Traditionally, you forecast each firm's financials to discount the cash flows back to present value. You want to visualize how the inputs to your forecasts affect your intrinsic valuations today compared with today's price. And you want to accomplish your tasks quickly and effectively.

Figure 24.1, Analyst Dashboard,[1] illustrates a good way to accomplish your forecast tasks well, with the least effort. The dashboard consists of five sections, all displayed simultaneously:

1. The company name and ticker in the lower right-hand corner.

2. The value chart displaying high-low prices and intrinsic valuations in the upper right-hand corner.

1LCRT Research Platform Analyst Dashboard, based on a Personal Annual Sheet of Corporate Value Services, LLC. In addition to providing security analysts a generalized method of designing their forecasting methodology within Excel, the LCRT research platform enables backtesting the DCF intrinsic valuation models for robustness, bias, accuracy, and predictive capability across the universe of stocks in the database that is connected. Since the models are programmed in Excel in a personal sheet owned and controlled by you, proprietary models can be tested without disclosing their structure to anyone else.

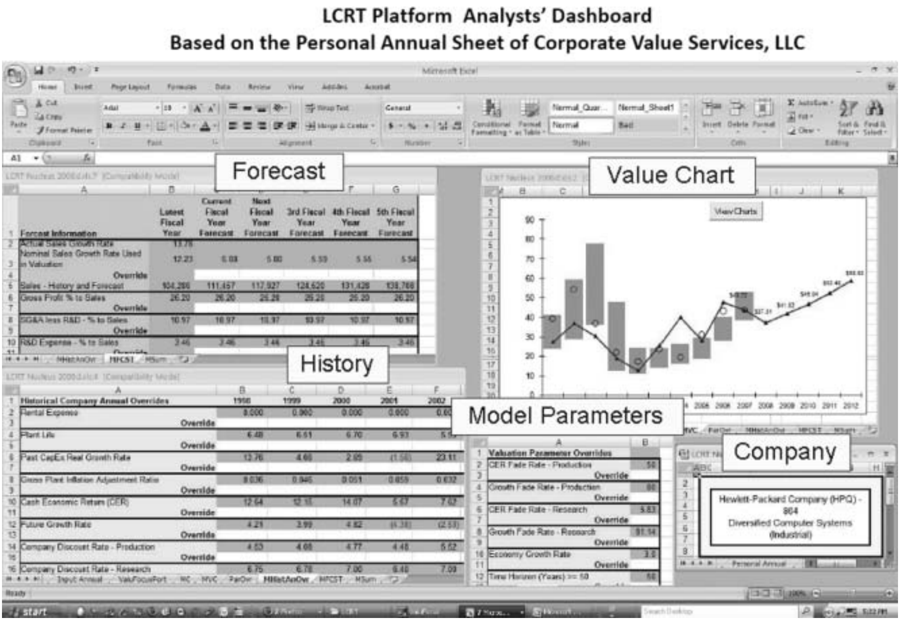


FIGURE 24.1

Analyst Dashboard

3. Your forecast assumptions in the upper left-hand corner.

4. The history that forms the basis for your forecasts in the lower left corner.

5. The intrinsic valuation parameters in the middle lower area.

The value chart and the company name are obvious. Each needs no further explanation.

The keys are the history and the forecast.

You'll typically want to review the history closely to identify any strange data, discontinuities, and other items that would distort the baseline for your forecast. For example, suppose you notice a significant discontinuity in the intrinsic valuation at precisely the same time a major acquisition occurred. If it is large enough to be worth the manual2 effort, you may wish 2Actually, database vendors could capture this depreciating asset data from the consolidating statement of the two entities that is usually disclosed in the footnotes

or other filings. This data capture would enable completely automating the pooling treatment for the year in which the acquisition occurred. The data capture also would provide a sound basis for translating subsequent annual statements into better information for both economic performance measurement and intrinsic valuation purposes.

to annualize the consolidated results and restate the financial statements on a pooling basis[3] to better reflect the economics and associated intrinsic valuation calculations. Importantly, you want the historical baseline of intrinsic valuations to pierce the high-low range of historical prices. If not, search for accounting anomalies, missing liabilities, off-balance-sheet items—anything that your extensive experience would bias your model relative to the history of prices. For example, within the LCRT framework, the economic life of the depreciating assets becomes crucial to calculating cash economic returns. Suspicions are raised when the calculated life differs significantly from other firms in the same industry or varies from year to year. Find out. Override the calculated life with a number more reflective of the economics for the business—perhaps from industry or other data.

The Forecast window in the upper left provides a way of instantaneously calculating the intrinsic valuation impact of any change in your drivers.

Traditional drivers include revenue growth rates, margins, capital turnover, tax rates, and so on. Since the window is programmed in Excel, any model (simple to complex) can reflect your views of how best to structure your forecasts.

Model parameters form the bottom middle Excel window. For LCRT

models, these parameters include fade rates, steady-state fade-tos for CERs and growth rates, real discount rates, and other universal drivers for all the firms in the universe. Since these parameters were specifically derived [3]In contrast to purchase accounting, a pooling basis better captures the historical cost and the economic life of the depreciating assets for the IRR cash economic return calculation. Bringing depreciating assets onto the acquirer's balance sheet at appraised value, as though brand-new, fails this economic measurement purpose.

Pooling also clearly separates both accurate economic performance and acquisition purchase price valuation issues reflected in the debt assumed, cash paid, and additional shares issued. Purchase accounting with goodwill improperly mixes economic performance and valuation measurements. LCRT excludes nonoperating, purchase goodwill from the asset base that we employ to calculate cash economic returns. We do include cash paid, debt assumed, and additional shares issued in calculating intrinsic valuation.

Eventually, we hope that accounting principles will better support both economic performance measurement and intrinsic valuation calculations than it does now for your benefit. Much confusion exists on the clear purpose of accounting information. Part of this confusion arises from the simplistic focus on just earnings instead of cash flow and cash investments in the operating assets of the company.

With this better information, you may calculate more accurate cash economic returns (CERs). These CERs compare directly to investors' real discount rate or the company's cost of capital to measure how well your agents are managing the company's capital deployment on your behalf.

to assure that 50 percent of the universe is undervalued and 50 percent is overvalued, we do not recommend that you override them permanently; you will bias the models. However, you might want to see what happens to the value chart when you play with certain parameters. This will give you a better understanding of the sensitivity of intrinsic valuation to these parameters and model structure.

Of course, parameters in your preferred models will differ from those in our LCRT models.

FINANCIAL MODELERS AND IDEAS FOR FUTURE PRACTITIONER RESEARCH

As a financial modeler, what can you learn from *ValuFocus Investing* and LCRT's extensive research experience? Here are a few ideas.

■ Most of our research confirms Benoit Mandelbrot's findings that stock price changes follow stable Paretian fat-tailed distributions, with infinite variances. Consequently, the correct objective function for

model building is to minimize the least absolute deviations, instead of traditional least squares. Please see the footnote reference on "fractional ranks"

around Figure 30.5, "Virtuous Model Development Cycle."

■ The best way to assure that the model creates parameters that are 50

percent undervalued and 50 percent overvalued is to correlate fractional ranks of percent under- (over-) valuation against the fractional rank of each company economic driver variable. These drivers in LCRT models include cash economic returns, sustainable growth rates, percent debt to debt capacity, asset size, and so on. Please see Figure 30.6, "Under-

(Over-) Valuation and Beta" for an example of these fractional rank correlations. Correlations in fractional rank space also address the fat-tailed, non-Gaussian normality of most data.

■ Eugene Fama is credited with the creation of the price event research methodology. Any variable that shows statistical significance in price event studies may be translated into an economic driver variable for intrinsic valuations. For example, state poison pill policies, if properly measured, might prove a fruitful area to enhance intrinsic valuation accuracy.

■ In my view, combining the best of multifactor modeling with intrinsic valuation modeling promises to better explain price change on quarterly, monthly, weekly, daily, and hourly time scales. Decomposing price changes into their underlying drivers—both economic and behavioral effects (sentiment)—can form the basis for much more complete price formation models. We offer an example.

■ Measure quantitatively the portion of price reaction related to intrinsic valuation change and the portion related to the release of new, value-relevant information.

■ EPS surprises, namely, actual quarterly EPS results versus consensus estimates. Some LCRT consulting work suggests that negative surprises cause an immediate downward price reaction in day one after release of the data with no recovery. However, after an initial one-day price rise to reflect positive surprises, the market reverses course, causing purchases in day five to be at lower prices.[4] Impulse functions may

prove a fruitful method of modeling these price reactions.

■ Accomplish the same research with earnings revisions of consensus estimates.

■ Measure the difference between audited financial statements, preliminary annual releases, and quarterly releases.

■ Measure the cyclic price behavior (Fibonacci ratios, etc.) and momentum, using intrinsic valuation as the anchor.

■ Tick price/volume data may provide an early warning on whether intraday price movements are arising from portfolio managers building or liquidating a position, or traders simply following momentum within Bollinger bands.

■ Incorporate measures of price discounts due to marketability and liquidity, such as Ashok Abbott's block trading insights,5 into VWAP6 trading strategies to assure sufficient volume exists to accomplish rebalancing of large positions.

Possessing accurate intrinsic valuations as anchors opens many productive avenues of further research, previously unexplored in *in* efficient 4Remember, sell on day one but wait until day five to buy, after the market has recovered from its overreaction and is pricing the stock more favorably for a buy.

We are not trading vigorously. We are trading tactically. Good research is at work here. Changes in fundamentals are probably occurring.

5Ashok Abbott, "Measures of Discount for Lack of Marketability and Liquidity,"

Chapter 18, *The Valuation Handbook: Valuation Techniques of Today's Top Practitioners* (Wiley, 2010), pp. 474–507.

Ashok relaxes the traditional academic assumption of efficient markets by measuring blockage discounts. With the economic meltdown and freeze of markets that occurred worldwide, a deeper economic understanding of markets has become paramount to practitioners, regulators, and politicians.

Portfolio managers know that large block trades cause price impacts. Ashok quantifies price impacts by comparing the shares in block trades against average daily trading volume as a measure of liquidity.

6Volume-weighted average price.

markets. The basic concept of this research combines the best of multifactor and technical analysis with DCF intrinsic valuation. These three silos virtually never talk with one another. Yet they form the basis for much trading.

Bridging these three specialty silos likely will produce real insights into the price formation process of inefficient markets within ranges of bounded rationality.

Eventually, we want to understand the price formation process at the month, week, day, and hour time frame. Benoit Mandelbrot's immense insight into the fractal self-similarity of these price movements can prove most helpful here. Fractional Brownian motion from the correct generating functions becomes the basis for modeling the distributions of price formation.

KEY TAKEAWAYS

1. As a security analyst, you may learn much from *ValuFocus Investing*:

■ Empirically validate your terminal valuations with historical data.

■ Employ an Analyst Dashboard to simultaneously view your company's value chart, baseline historical data, model parameters, and forecast assumptions. Instantly view the intrinsic value effect of changing your forecast assumptions and overriding historical calculations to better reflect the business cash economics.

2. As a financial modeler, you can link intrinsic valuation anchors to your multifactor and technical research to create price formation models at the month, week, day, and hour levels.

CHAPTER 25

Wealth Management

V *aluFocus Investing* has suggested throughout this book that cash and intrinsic valuation should form the core of any investment strategy.

What are the implications of cash intrinsic valuation for you, as a wealth manager? What are practical approaches for using tools arising

from this book's insights in your continuing dialogue with clients?

LCRT's consulting work produces a most powerful tool for you to employ with your clients. Figure 25.1 displays the percentage under- or overvaluation for every stock in the portfolio compared with the universe from which it was drawn. The horizontal axis is the percent under-or overvaluation. The vertical axis is the cumulative percentage of the universe.

This particular long portfolio does not appear to be based on intrinsic valuation principles at its core. In fact, it appears to be a safe portfolio with a significantly narrower distribution of fair-valued stocks compared with the universe. Actually, a majority of the stock selections are overvalued. To compound the problem, the portfolio appears to avoid the upper tail of the most undervalued stocks, while becoming somewhat of a closet indexer close to the fair-valued part of the universe.

From an intrinsic valuation perspective, this portfolio management style is not worth the fees paid to the manager. These insights can raise the level of deep discussion with your clients.

This powerful display can be applied using any intrinsic valuation model.

Figure 25.2 displays the tickers of each stock in the portfolio. When meeting with your client, you can display the value charts from ValuFocus to foster a deep discussion on how best to reorient the portfolio toward more undervalued securities.

Present value arithmetic confirms that high–cash economic return firms are much more sensitive to changes in the investors' real discount rate than low–cash economic return companies. This effect of lower intrinsic valuation arises because cash flows from high-return, high-growth companies occur further out in the future than those cash flows from low-return, low-growth firms. Thus, the present value of these cash flows from high return, high growth is less if the investors' real discount rate increases. Figure 25.3

100

Portfolio

90

80

70

Universe

60

50

40

30

Cumulative % of Universe

20

10

0

−100 −80

−60

−40

−20

0

20

40

60

80

100

% Under (Over) Valuation

FIGURE 25.1

Intrinsic Valuation Comparison of Portfolio to Universe displays cash economic returns close to the distribution of the universe. The manager for this portfolio does not appear to be incorporating any view on whether the market is under-or overvalued. In overvalued markets, portfolios should be tilted toward low CER stocks that are undervalued in order to outperform the market decline. If your clients don't mind the losses in a declining market, this portfolio is okay. Your clients just need to understand the potential outcome of your portfolio strategy.

As a wealth manager, you can use the format of these portfolio displays relative to a universe to further evaluate numerous aspects of the portfolio for your clients' benefit. We list 14 here; there certainly are more.

1. Actual total shareholders' return performance.

2. The progression over time toward advanced fat-tailed risk measures, based on significantly more accurate stable Paretian distributions.

3. The contribution of each stock holding to these advanced risk measures.

4. Cash economic return momentum.

5. Price momentum.

6. Company size based on constant-dollar gross investment.

100

ETH

KRB

VZ

MO

RMY

90

GVX

XOM

AWE

AT HPQ

MCD

COST

80

BAX

EDS

KMB

WYE

ADM

BEN OW

70

KSS MSFT

TGT IPM

WYWFC

CAT

60

LNC CFE

INTC

MEL

50

CEEK ABT

RIG

FDG

WM

40

GCI PG IBM

KO TEVA

HER

BUD

30

AMGN

Cumulative % of Universe

UPS DOW

WMT CSCO

MMM

20

AIG G

GE

AA

10

ZMH

BA

TLAB

UNP

0

−100 −80

−60

−40

−20

0

20

40

60

80

100

% Under (Over) Valuation

FIGURE 25.2

Portfolio Tickers by Valuation

7. Firm returns on capital or returns on equity compared to cash economic returns.

8. Asset life.

9. Asset age.

10. Percentage of foreign sales.

11. Price to earnings ratios.

12. Price to equity book ratios.

13. Revenue growth rates.

14. EPS growth rates.

In fact, these displays can enable mutual fund/ETF evaluation firms, such as Lipper and Morningstar, to quantify visually the characteristics of these portfolios. After the fact, these firms also can

measure the cross sectional distributions of the stock returns within these portfolios. They can employ traditional Gaussian normal statistics as well as the paradigm-shifting, significantly more accurate research of Benoit Mandelbrot into fat-tailed stable Paretian distributions.

100

90

80

70

60

50

40

30

Cumulative % of Universe

20

10

0

−10 −5

0

5

10

15

20

25

30

35

40

45

50

Portfolio Cash Economic Return

FIGURE 25.3

Portfolio Cash Economic Return

KEY TAKEAWAY

Charts that measure the intrinsic valuation characteristics of portfolios can prove a most effective way for you as a wealth manager to communicate with your clients.

CHAPTER 26

Portfolio Construction

For portfolio construction, we need a new theory to replace mean variance.

We need a new theory, because we find Benoit Mandelbrot's paradigm shifting research into stock return distributions most convincing. These distributions are fat-tailed, most likely have infinite variances, and even, sometimes, infinite means. Figure 28.1, "Distribution of Stock Returns,"

Figure 29.1, "Cash Economic Returns, Including Small StartUps," and Chapter 29, "Producing Lower Fat-Tailed Risk with Higher Returns"

summarizes the empirical evidence that we find so convincing.

So, any theory based on traditional statistics—mean, variance, standard deviation, correlation, least squares regression analysis, CAPM beta, and Sharpe ratios—do not describe the real world of investing. Thus, they all need to be revised, based on statistics that actually exist.

Not everyone agrees. Efficient market advocates, such as Eugene Fama

and many others, tend to believe one or more assumptions.

1. Price always equals intrinsic valuation. Any intrinsic value estimate that differs significantly from price cannot exist.

2. Any pricing errors relative to intrinsic valuations are unbiased, so excess returns cannot be consistently earned.

3. The market is so efficient that, after transaction and price impact costs, results cannot exceed the performance of a capitalization (CAP) weighted portfolio of market securities. Any results achieved over a short period of time are purely by chance.

We buy into the concept of diversification; don't place all your eggs in one basket. Harry Markowitz was the first giant in the profession to prove this diversification concept with traditional mean variance statistics.

Diversification still can work in a fat-tailed world, but with different mathematics.

What new theory and practical application do we suggest?

NEW THEORY

We wish to build on the empirical evidence outlined in this book.

Common sense tells us that avoiding too much concentration in one area or another of the market defeats diversification. Thus, purchasing stocks in many industries or sectors seems like a wise idea.

Certainly, the recent economic meltdown confirms that placing all your eggs in the subprime mortgage market is a recipe for disaster. In fact, we sense that the new research department within the Federal Reserve, established to measure the possibility of systemic risk events, will be focusing primarily on concentrated positions in portfolios as indicators of potential systemic risk.

I have heard no mention of using mean-variance in its methodology.

Many risk management systems within firms specifically measure

concentrations that are too high in some sense.

Extending the LCRT framework into portfolio construction suggests that diversification also should be measured against the following five dimensions, in addition to simplistic industry or sector weightings: **1.** Cash economic return.

2. Percent of debt to debt capacity.

3. Asset life.

4. Asset age.

5. Company size as measured by constant-dollar gross investment.

BEGIN WITH UNDER-AND OVERVALUATION,

THEN DIVERSIFY

Broadly, based on our research from Chapter 29, "Producing Lower Fat-Tailed Risk with Higher Returns," Table 26.1 suggests that the universe can be divided into three areas.

TABLE 26.1

Division of Universe into Three Areas

Undervalued (top 20%)

Least risky

Overvalued (bottom 20%)

Less risky

Fairly valued (middle 60%1)

Most risky

1These top, bottom, and middle areas might appear to be inconsistent with our model parameterization that 50 percent of the firms are undervalued and 50 percent are overvalued. No inconsistency exists, because the top and bottom 20 percent quintiles offset each other to maintain the 50 percent under-and 50 percent overvalued in fractional rank space.

Clearly, we want to make our less risky security selections that promise the highest returns from the undervalued and overvalued areas while also diversifying our selections. We simply reduce concentration in fairly valued stocks that are the most risky and promise the least risk-adjusted return.

This does not means that we have a more concentrated portfolio than the CAP-weighted, highly diversified portfolio recommended by efficient market advocates. Instead, we have a diverse portfolio with different weights.

WEIGHTING SCHEMES

We like to divide weighting schemes into five broad categories: **1.** Capitalization (shares times price).

2. Equal.

3. Fundamental size (revenues, assets, earnings, dividends).

4. Intrinsic value.

5. Constant-dollar gross investment.

Rob Arnott of Research Affiliates has patented fundamental weighting schemes as a better measure of size than capitalization weighting. These fundamental weights include sales, earnings, dividends, assets, and any accounting variable related to footprint size in the economy. Arnott does admit, however, that his fundamental weights may be picking up the small company effects. Small firms tend to be less liquid and, therefore, they also tend to possess wider ranges of under- and overvaluation. For that reason fundamental size weighting also may pick up a valuation effect.

Lee Hayes, in Chapter 20, “Advanced Portfolio Concepts,” recommends equal or intrinsic value weights. Both these weighting schemes avoid purchasing a greater proportion of overvalued stocks and selling or shorting a greater proportion of undervalued stocks, as CAP weights do. We feel that if you want to be a value investor, it is better to use an accurate measure of value (intrinsic value), rather than any size proxy based on accounting data.

REBALANCING YOUR PORTFOLIO

Instead of arbitrarily selecting a monthly or quarterly time frame for rebalancing, we like Lee Hayes's suggestion in Chapter 20 of more continuous rebalancing; always try to migrate toward your preferred weights and diversification. A collar approach can reduce trading costs. In a collar approach, your target weights for diversification are not absolute, but ranges, or collars. You only rebalance when the weight exceeds the collar on the high or low side.

BENEFITS OF CONCENTRATION

There are good reasons to have a concentrated portfolio. Risk is similar to uncertainty. The best way to avoid uncertainty is to know where stocks are heading. It's easiest to do that by comparing the company's stock market price to its intrinsic valuation. Fairly valued stocks are risky in the sense that we are not sure where they are going next.

Holding fewer stocks reduces trading and costs. Making good selections of undervalued stocks offer a better opportunity to outperform the market and achieve superior returns. There are fewer stocks to worry about in terms of their risk impact. Ideal is a solid portfolio of good companies with strong fundamentals, currently being undervalued by the market. We have a friend who is a professional investor with a highly concentrated portfolio.

He combines use of an automated DCF model with analytical expertise.

Consider the stable Paretian risk measure, plus concentration ratios.

Stable Paretian risk is non-Gaussian, or features non-normal risk distribution, with tails indicating extremes. History tells us that the big blow-ups of the last three decades have been a function of concentrating in one sector or one stock, while being highly leveraged at the same time. Recent history serves up a good example, driven by the subprime mortgage fiasco. Being both heavily leveraged and overly concentrated is a recipe for disaster.

There is a proper balance between diversification and concentration.

The size of your portfolio may depend on the amount of time and skill you apply, and it may depend on your financial resources. We can say

50 to 75 stocks are sufficient for a well-diversified portfolio, provided there aren't any liquidity problems within this group. Some studies by the professionals indicate that 50 to 60 stocks aren't enough; others may duplicate it, causing liquidity issues. Research indicates that stable Paretian distribution reaches minimum dispersion after 50 to 60 stocks are in the portfolio. Eugene Fama says the right number is 100,[2] yet our friend mentioned previously who is doing very well, thank you, has just 20 stocks in his portfolio. A probable question for most of our readers is how many stocks you can afford to hold.

As we indicated before, we continue to analyze diversification and concentration, and we now are looking at sector and industry impact on risk.

Our conclusion is that it is best to work with stable Paretian distribution, not Gaussian, assuming that distribution of risk is not normal. We are encouraged that interest in studying the effect of stable Paretian distribution is growing among academics.

2Eugene F. Fama, "Portfolio Analysis in a Stable Paretian Market," *Management Science*, January 1965, pp. 404–419.

Another truth in this scenario is that a few losses overwhelm a few gains.

You need more gains than losses. That reality argues for our LCRT modeling to identify companies with good fundamentals and growth prospects that are being undervalued at present by the market, and it also argues for diversifying across sectors and stocks as much as possible. We know that overleverage in companies can be a problem, so debt-to-debt capacity also is something to look at.

KEY TAKEAWAY

Concentration ratios may be much better than traditional mean-variance for measuring portfolio diversification. Most great meltdowns occurred in portfolios with too great a set of concentrations in particular stocks, industries, or sectors. The great meltdown in 2007–2009 concentrated in the home mortgage sector, with no verification of borrower's income, induced by government policy to encourage home ownership.

Section

Seven

Advanced Topics for

Academics

INEFFICIENT MARKETS

We deeply respect those academics who now recognize that the world (investors, policy makers, and common people) need a new theory of less efficient markets. The recent economic meltdown should have taught everyone that lesson—both at the macro level of public policy and at the micro level of purchasing or selling an asset. The profession needs to relax the following four related assumptions:

1. Price always equals intrinsic valuation.

2. Past events have no effect on future events.1

3. People are perfectly rational.

4. All people have identical expectations, beliefs, and related models.2

Common sense tells us these assumptions need revision for mankind to jump to the next level to develop better empirically validated theory consistent with real world events and data, to make the world a better place to live.

CHAPTERS IN THIS SECTION FOR THE ACADEMIC

1The assumption of statistical independence draws from a distribution.

2The assumption of homogeneity of investors in the market.

Chapter 30: Comparing Our Model against Three Popular DDMs
Chapter 31: Suggestions for Additional Academic Research **Chapter 27: Another Tour through our LCRT Model 1.** Regression toward the mean or fade of company cash economic returns and growth enables us to transform a multiperiod model into a single-period model.

2. Consequently, single-period models produce intrinsic valuation calculations for each year based purely on historical data.

3. Value charts juxtapose fiscal year high/low prices against the intrinsic valuation of multiple models to enable you to visualize the results for each firm.

4. Tracking errors quantify the accuracy of each model. More accurate models tend to be more predictive, and thus are more useful for your decisions to buy, hold, sell, or short stocks.

5. The inflation-adjusted cash economic return reflects the average real internal rate of return of all the projects in place, with less bias than traditional accounting return measures. As a result, this economic measure compares directly with the cost of capital or investor return requirements to determine if the company's projects are creating or destroying value.

6. The sustainable growth rate reflects the cash available for reinvestment after dividends and provides a good estimate of the likely future growth in assets.

Chapter 28: Incorporating Risk into Our Model 1. Rawley ranges of bounded rationality (like Bollinger bands) measure the likelihood that prices will reach an inflection point and reverse course. As a result, these ranges help you make much better investment decisions.

2. These ranges of bounded rationality measure the dispersion of high/low prices around the intrinsic valuations as the anchors.

3. Dispersion models of ranges of bounded rationality rely on complex, nonlinear functions of cash economic return, size, and trading volume.

4. Concentration ratios may be much better than traditional academic mean-variance for measuring portfolio diversification. Most great meltdowns occurred in portfolios with too great a set of concentrations in particular stocks, industries, or sectors. The great meltdown in 2007–2009 concentrated in the home mortgage sector

with no verification of borrower's income—induced by government policy to encourage home ownership.

Chapter 29: Producing Lower Fat-Tailed Risk with Higher Returns

1. Distributions in the field of finance and investments tend to follow fat-tailed distributions. These fat-tailed distributions can best be described with the stable Paretian distribution, often with infinite variances and sometimes even infinite means.

2. The cross sectional performance of the top undervalued stocks and the bottom overvalued stocks display higher Gaussian standard deviation risk. However, they display lower stable Paretian alpha peakedness risk.

Measurement of risk with Benoit Mandelbrot's fat-tailed research turns the world upside down.

Chapter 30: Comparing Our Model against Three Popular DDMs

1. LCRT's methodology builds from automated discounted cash flow modeling. Automated essentially means that the model can value any one or combinations of the thousands of companies that the investor selects from the 7,000 U.S. companies database for study without analyst intervention.

2. Four decades of intensive research produced four primary measurement principles to evaluate the performance of an automated valuation model.

■ Robustness. This determines the size of the universe of stocks the model can reasonably value.

■ Accuracy. This answers the question of whether the model's intrinsic value estimations are close to actual market prices.

■ Nonbias. This helps us understand if the model systematically avoids over-or undervaluing the stocks within its scope and against its economic drivers.

■ Predictability. This determines whether the model forecasts stock returns rather than simply estimating current market prices.

3. More accurate models produce more predictive results.

4. Reducing bias from any driving variable increases accuracy and

therefore predictive capability.

5. Applying these measurement principles of "goodness" to the terminal valuation structure of any analyst's traditional cash flow forecast with historical data from the entire universe can improve the analyst's intrinsic valuation process significantly.

6. Therefore, reducing terminal valuation bias will significantly improve the prediction of security analyst forecasts.

Chapter 31: Suggestions for Additional Academic Research 1. This chapter briefly outlines a set of research topics that extend the *in* efficient market theory described in *ValuFocus Investing*.

CHAPTER 27

Another Tour through Our

LCRT Model

Okay, here is a chapter that digs even deeper into the LCRT model, getting fairly technical at times to answer likely academic questions. It covers much of the same ground we already incorporated into the book, but is much more detailed. You will find some similar content, but there is more to be learned by sticking with this description of the model in building your knowledge. You could argue that the entire book is explained in more technical terms in this chapter. We encourage you to read on.

The LCRT framework incorporates the five key components that enable investors to determine the intrinsic value of a business enterprise.

1. The company's historical economic performance, measured and reported in financial results.

2. Description, progress, and some quantification of corporate strategies, reflected in analysts' and your forecasts of future economic performance.

3. Similarly, some good quantification of intangible drivers of value—the quality of management to sustain competitive advantage against their competitors (beat the competitive fade).

4. Macro factors driving the world, country, economy, industry, and company (taxes, monetary policy, government expenditures,

protection of property rights, etc.).

5. Collective investor sentiment and behavior translated into market behavior and momentum. Market participants are not perfectly rational human beings.

Clearly, we aren't neglecting to factor market behavior into the equation. We may criticize its emphasis in making decisions. However, we must be realistic and recognize its impact on price. Indeed, market psychological behavior determines stock price and it always will. Our goal is to have it be based essentially on the intrinsic value of each company, calculated correctly using the economics of cash as the foundation.

We argue that accurately calculating a company's intrinsic value is the best basis to forecast its future stock price. When most investors essentially are being driven by intrinsic value in buying and selling stocks for their portfolios, the market will be pricing companies' equity based on their 257

intrinsic values. We would hope that this is not just a pipedream. Each of you can help the market get there by using this technique.

We are not so na¨ıve or single minded to think that we can depend solely on estimating intrinsic value. We always will have to take into account what the market is doing. It is to our advantage to know that the present price of a stock is less than its intrinsic value. Eventually, the market is likely to realize that and push up the price as investors buy shares.

Nor does our financial calculation of intrinsic value and tracking of market behavior complete the process of making stock buy/sell/hold decisions. As we have indicated before, our detailed description divides the LCRT model into the five key parts: economic performance, strategies, intangible value drivers, macro factors impacting the business, and stock market momentum.

DESCRIPTION OF THE LCRT MODEL

This chapter describes the LCRT model. It summarizes ideas and information already described. It digs deeper than previous chapters into the following:

- How best to construct an effective model.

- Basic components of a good model.

- How to best incorporate the assumptions necessary for any model.

- The importance of regression toward the mean or fade to produce an intrinsic valuation for each year.

- Comparing conventional models with LCRT models employing a value chart and tracking errors.

- Understanding in detail:

- Cash economic return (CER).

- Sustainable growth rate.

- Discount rate.

CONSTRUCTING THE MODEL

As we get into describing the LCRT model, we introduce numerous terms and explain some parts of the investment lexicon. We name some terms to identify and describe a particular function or component. These terms define essential components of the model.

As an overview, we start with a fundamental description of the model itself and how it measures economic, cash-based performance. Essentially, we seek to overcome some flaws of other discounted cash flow models to achieve accurate readings of intrinsic value, leading to better prediction of future price.

An important point here: The way we are assured of accurately setting the fair value of a business is by backtesting our model. Backtesting is as fundamental to stock investors as breathing is to all of us. Doing accurate backtests is critical. We work hard in this book to persuade you of the reliability of our backtesting methodologies and results.

Our intent is to convince you that we have honed the empirical evidence necessary to get you to be confident enough to start using the LCRT

methodology.

We begin by building the foundation of the LCRT model. It is based on the discounted cash flow approach. DCF is at the very heart of valuation, since cash is the most reliable way to measure how a business is doing. Of course, we all know that money is even more basic than that, don't we.

DCF is rooted in the work of such scholars and investors as Benjamin Graham and David Dodd in the 1930s1 and Merton H. Miller and Franco Modigliani in the 1960s. M&M were the first to separate cash flows resulting from existing assets and from future investments. Bart Madden later adapted this important decomposition of cash flows (please see Madden's footnote in Chapter 13, "Building a Price Formation Process"). DCF has become the most widely accepted way to put a value on a business and thus forms the basis of equity investment. The worth of a business is the sum of its future net cash receipts, discounted to a present value as indicated by an accurate intrinsic value calculation. Net cash receipts constitute cash flows from operations, minus cash spent to reinvest in maintaining and growing the business.

Thus, investors say that today's stock price reflects the company's future cash flow. Here we are consistent with the vital notion accepted by all stock investors, namely, that today's price rewards future performance, whether measured in earnings (profits), cash, revenues, or a combination of these and other metrics.

Cost of capital is an important piece of this valuation puzzle. A business is valued on the results (returns) achieved by existing assets and the results (returns) expected from continuing to invest (spend capital) in more assets aimed at growing the enterprise. So we figure the present value of cash flows from both current and future assets. For the company to increase its value, investments in future assets must achieve returns higher than the cost of capital. In this positive environment, additional investments happily serve to create more value.

Otherwise, if returns hover around the cost of capital, the new investments won't move the needle in terms of raising market value. Indeed, some 1Benjamin Graham, David L. Dodd, Sidney Cottle, and Charles Tatham, *Security Analysis: Principles and Technique*, 4th ed. (Mc-Graw-Hill, 1962).

managers face the misfortune of spending capital poorly and in the process destroying value instead of creating it. When returns on investments are below the cost of capital, the company destroys value.

You can see how measuring returns against a cost of capital brings in the element of risk.

What is the cost of capital? There are two ways to look at this cost.

One is the actual cost to the company, namely, the cost of debt and equity together. These include the costs of debt service/interest and the cost of being a public company in issuing equity and maintaining shareholder services.

Companies, investors, academics, and others compute a weighted average cost of capital that combines the cost of debt and equity. It is useful to understand the cost of equity and cost of debt separately as well.

The other is the cost for the investor. The widely accepted general formula for the latter is built from combining return and risk. To be satisfied, investors must gain a return that more than compensates for the risk. As a foundation, they start with the return of a risk-free investment, such as a Treasury bill. Then they account for the risk in the stock, logically requiring a higher return from the riskiest stocks to justify investing in them. The popular way that most investors account for that risk is by determining the volatility of each stock's price. Volatility relative to the market is called its beta, with the capital asset pricing model (CAPM) being the method of choice.

We take a more refined approach, translating where the company is in its life cycle into a risk level. We have found this method to be a far more reliable tool for measuring risk. Indeed, the model is named for this vital component, the LCRT, or life-cycle return.

Remember, the goal here is to be able to end up with the most accurate calculation of intrinsic value possible. This goal implies overcoming the weaknesses that cause investors to look elsewhere for a reliable metric, sadly settling too often on just earnings.

BASIC COMPONENTS OF THE MODEL

The essence of the analysis is the reality that there are many variables and assumptions contained in the modeling process. Indeed, these variables and assumptions carry over to other models being used by investors. In most cases, these models even incorporate the same

information. Importantly, we find flaws in the use of net free cash flow as the true economic benefit. These flaws add to the challenge of accurately valuing a business.

Together, these realities of current modeling have resulted in arriving at a host of different readings of intrinsic value. This unfortunate reality

of so many intrinsic value readings[2] has effectively stopped the investor community from universally adopting economic cash flow as the method of choice.

So here we go. We modify our basic DCF approach, borrowing a refinement first described by Dr. Shannon Pratt in his book *Valuing a Business*.[3]

He calls the approach the discounted economic income method, or DCEI.

This refinement enables us to consider the various sources of economic income. These can include gross revenue, gross profit, net operating profit, net income before tax and after tax, operating cash flow, net cash flow before and after tax, and net cash flow available for distribution to owners.

Many investors and academics look at just net free cash flow after capital spending and working capital changes. What we have is the money left to reinvest in growth projects when all the expenses have been paid, including compensation, taxes, and maintenance.

In building our more reliable model, we also give serious consideration of whether to use an equity model or an invested capital model. We are answering the question of which economic measure to use. On the one hand, the equity model gives a value to a business by looking at estimated future cash returns theoretically as dividends. This approach has been popularized as the dividend discount model. On the other hand, the invested capital model incorporates all the capital deployed by the company in estimating cash returns and making them available to both equity and debt holders.

This leads us logically to a third consideration, which is whether to apply a single-period or multiperiod element. The equity model uses multiple periods to accommodate anticipated near-or intermediate-term changes in the capital structure, growth rate, or margins. Time

frames typically are annual. Thus, a multiple period can cover several years.

For companies expected to grow revenues, earnings, and cash flow at stable levels for many years, we use the single-period capitalization model to discount future economic income benefits. Think of it as a single-state discounted economic income method. We call it the capitalization model.

In theory, each model should calculate the same value. They use the same information. Our goal is to forecast long-term growth, which is harder 2Before the advent of the comprehensive measurement principles of automated discounted cash flow evaluation, no validated empirical framework existed for objectively comparing models, to our knowledge. As extensively discussed earlier, these measurement principles include robustness, accuracy, nonbias, and predictive capability.

3Shannon P. Pratt, *Valuing a Business: The Analysis and Appraisal of Closely Held Companies*, 2nd ed. (Dow-Jones Irwin, 1981, 1989).

to do when short or interim growth varies. So, note a key difference in the two methods: The capitalization method forecasts a single rate of long-term growth. It doesn't vary the growth rate, beginning at the sustainable growth rate, or capital structure from year to year.

DEALING WITH THE MANY ASSUMPTIONS

This is a logical place to bring in net free cash flow. We add "net" because the full phrase is more familiar to investors, but it means the same as free cash flow. We indicated earlier that it is another main issue in using the economics of cash in estimating intrinsic value. It has its faults, chiefly the result of the many assumptions that investors and analysts must use. Critical variables required to calculate value are highly subjective.

Even the evaluation of past performance by each investor and analyst is personal and subjective Add how best to interpret management projections and industry forecasts and other macro factors. You can readily see how differences from person to person and small changes in underlying assumptions can significantly impact the calculation of value.

Getting specific, we offer this prime laundry list of performance inputs that constitute assumptions in projecting economic performance:

- Sales growth rate.
- Cost of goods sold.
- Selling and administration expense.
- Desirable financial leverage.
- Capital spending.
- Cost of debt.
- Collateral values and source of lending.
- Inventory investment.
- Accounts receivable and payable.

We're sure that already you have thought of some more items. With this much subjectivity, it is clear that the individual analyst's experience, intelligence, skill, and judgment sizably influence the outcomes of the model.

These sizable influences occur even though we all likely are working with the same data from company and other disclosure sources. We often see 20

or more key assumptions baked into DCF models based on judgment. Small changes in assumptions can result in large changes in determined value. A key issue is the problem of forecasting separate line items, while failing to assure that the aggregate results are reasonable.[4]

4As we demonstrated in Table 12.1, small changes in terminal valuation assumptions create huge changes in intrinsic valuations.

TABLE 27.1

Net Free Cash Flow

Net income

$204,104

+ Depreciation

$ 22,772

+ Working capital decreases

$ 51,587

− Capital expenditures

$ (34,809)

= Net Free Cash Flow

$243,654

For purposes of estimating net free cash flow, these assumptions play out in the income statement and balance sheet, which serve as the basis to project cash flow. What we want to know is the available cash to be generated and how it is expected to be used. It is the cash available for reinvestment to cover normal operations and fund future growth opportunity.

We can lay it out in the formula in Table 27.1.

Net free cash flow is valued in the present and in the future. These discrete periods usually are measured in terms of years. A discount rate is applied to determine present value, which includes the risk involved. It incorporates the risk-free cost of capital (think Treasury bill), risk associated with whether the investment is in stock or bonds, the very risk of investing in the stock market, and the specific risk of the particular company.

We come back to the notion of whether to use a multiple or single period method in getting the best calculation of the risk. In traditional multiperiod models, analyst forecasts are made on year-by-year basis, with a final-year terminal value. That terminal value represents the present value of all the cash flows from the last year out to forever.

In contrast, a single-period capitalization model starts with today's economic characteristics and fades them toward the corporate average in automated fashion without any analyst intervention.

The multiple-period method by definition includes single-period calculations. For example, in earlier years when the cash flows move

at more dramatic levels, up and down from each other, the multiple-period model is needed. During ensuing years of steady, consistent growth, a single-period capitalization model is being used. The investor is, in effect, using a DCF model first and then a single-period model thereafter to determine the net present value of expected future cash flows. Thus, the approach becomes a multiperiod model. Varying net free cash flows from year to year have complicated investor efforts to identify a single long-term growth rate.

Our LCRT model relies on a single-period capitalization model for each time frame, overcoming the instability of volatile cash flows that require the multiple-period analysis. We do this by our life-cycle-based fade analysis to normalize structure and cash flow over time.

THE BEST OF BOTH: EXPLAINING OUR FADE PROCESS IN A SINGLE-PERIOD METHOD

The notion of fade is critical in the LCRT model. Fade makes it possible to use a single-period model. Equally important, it reduces the subjectivity of the various assumptions and information inputs from investors and analysts, including possibly your own. We use the term *fade* extensively throughout this book, so please think of fade as an entire process, not just a word.

This brings us logically to a fuller description of our fade proposition. We follow the well-established reality for most companies that cash economic returns and asset growth regress to the mean or average of all companies. Regression to the mean is a universally accepted reality in business. Most times, high returns fade down and low returns fade up. With apologies to linguists, we recognize that fade usually suggests a weakening and not a strengthening.

Fade is a mathematical measure of regression toward the mean. It is more than the notion of a company fading over time as competition moves in or the products or services lose favor.

The usual causes for companies to fade down are:

- Maturity of their once-hot products or services.

- Tough competition moving in to take advantage of a good thing.

■ Not managing growth or decline well.

■ Inefficiencies creeping in.

■ Management messing up.

The usual causes for fading up are:

■ Competitors dropping out.

■ Sustainable success in growing a market or markets.

■ Extending and expanding uses of products or services.

■ Continuing to be inventive.

■ Learning how to become more efficient.

■ Ability to reengineer, renew, rebuild, or whatever "re" you want to apply.

The math behind fade is tested and proven. An example provides the best way to show how fade calculations are determined. This is a multistep process. Take a look at the arithmetic example below.5

5Adapted from Rawley Thomas and Randall Schostag, "Discounted Cash Flow Method: Using New Modeling to Test Reasonableness," *Valuation Strategies*, September/October 2006, pp. 25–41, especially pp. 35–36.

TABLE 27.2

Investment Growth

Year	**Future Growth Rate**	**Constant-Dollar Gross Investment**
2010	5.67%	$21,779

2011

3.54%

$22,549

Increase

$

770

First, we are fading the gross asset growth rate. Our company employs constant dollar gross investment of $21.8 billion in 2010. Please see Table 27.2. Its sustainable growth rate begins at 5.67 percent. (We explain the precise sustainable growth rate calculation later.) We want to adjust that rate over time to mirror the real growth of the economy to 3 percent.

That 5.67 percent beginning growth rate must now adjust over time to mirror the 3 percent economy growth rate. Fading the excess (beginning growth less long-term economic growth rate) of the beginning 5.67 percent growth rate to the 3 percent economy growth rate by 80 percent6 per year results in a 3.54 percent growth rate in 2011 one year later, as illustrated in Equation 27.1:

Equation 27.1 Growth Fade Rate

$3.54 = 5.67 - 0.8 \times (5.67 - 3.00)$ The calculated growth fade rate applies each year to the expected growth in assets to determine the amount of new annual asset investment and the resultant total gross amount invested. Therefore, by applying the 3.54 percent asset growth rate in 2011, the model anticipates that the $21.77 billion 2010 gross investment will grow to $22.549 billion in 2011: $770 = $22,549 − $21,779 represents the change or new asset investment.

Okay, that is how we regress the growth rate in assets toward the 3 percent economy rate. Next, we are fading the cash economic return (CER) toward a normalized long-term rate consistent with other companies.

We explain the CER in much greater detail in a later section in this chapter in order to keep this train of thought on fade. For the moment, just think of CER as a one year return measure—the cash the business generates against 6Firms with large cash economic returns

and therefore high sustainable growth rates likely fade their possible growth rate toward the 3 percent economy growth rate rapidly.

TABLE 27.3

Gross Cash Flow

Year	**Constant-Dollar Gross Investment**	**Cash Economic Return**	**Constant-Dollar Gross Cash Flow**
2010	$21,779	20.17%	$6,462
2011	$22,549	16.46%	$5,877

the cash investment—all expressed in constant dollars. Again, we use an example in Table 27.3 to show how this works:

LCRT's production model[7] assumes the CERs fade toward 35 percent of the difference between the beginning CER and the 8.77 percent
2010

corporate average8 at a 50 percent rate. Consequently, the 20.17 percent CER in 2010 fades in 2011 to 16.46 percent in Equation 27.2:
Equation 27.2 Faded Cash Economic Return

$$16.46 = 20.17 - 0.50 \times (20.17 - 0.35 \times (20.17 - 8.77) + 8.77)$$

$$= 20.17 - 0.50 \times (20.17 - 12.76)$$

$$= 20.17 - 0.50 \times 7.41$$

$$= 20.17 - 3.71$$

$$= 16.46$$

Applying the 16.46 percent 2011 CER to the $22,549 gross investment produces $5,877 in constant dollar gross cash flow in Table 27.3.

We should note that small startup companies usually don't conform to these fade-down or fade-up patterns. The stock market prices these companies as though the successful survivors will achieve superior returns on average. Investors in small startups effectively are purchasing an option on superior economic performance resulting from the cash provided by the IPO that is invested in operating assets.

7We don't want to get hung up here on semantics. Our LCRT model is in a very real way a composite of many models. Right now, we are discussing the production model and the research model. These all are legitimate models and there are many more in this composite LCRT model. Currently, we are working on developing a hybrid model that combines the best of the production and research versions.

8Our research model shows that all companies fade to 8.0 percent cash economic returns (CER), but don't get hung up on that either. These fade levels vary from year to year. We apply our empirical research each year to assure that half the companies are undervalued and half are overvalued.

TABLE 27.4

Constant Dollar Net Free Cash Flow

Gross Cash Flows

$ 5,877

Replacement Investments

$(1,973)

Growth Investments

$ (770)

Constant Dollar Net Free Cash Flow

$ 3,134

Subtracting replacement and growth investments results in $3,134 in net free cash flow in Table 27.4.

FADE AND MODEL ACCURACY

Now that we have the net free cash flow, we are ready to discuss the effect of fade and how to measure accuracy of the model.

Fade adjusts abnormal returns—positive or negative—to a normalized return over time. Thus, a single-period model can be used. Most importantly, that single-period model enables extensive empirical testing of several models applied to thousands of companies over a decade. You can test the model's accuracy by comparing the actual price (P) with the intrinsic value (IV) (an arithmetic example appears later):

Equation 27.3 Model Accuracy

$$\frac{IV - P}{P}$$

An important caveat can come into play here. Conditions can cause the market to be over-or undervalued. It does happen. The possibilities are greater under certain situations, such as a new presidential or political party regime change, a serious run of inflation, a change in Federal Reserve or other significant policies. It can take several months—even a year or more—for the changes to become embedded in the aggregate level of stock price.

Examples of these kinds of huge changes abound. These macro changes caused or at least contributed heavily to market over/undervaluation. Congressional actions to lower the capital gains tax rate in 1979 had that effect as did major tax change driven by Congress in 1987. Actions by President Obama and the Congress

currently can trigger major market reaction resulting in stocks generally being over-or underpriced based on their values.

What matters is properly modeling the numerator effects on the cash flows versus the denominator effect of the discount rate.

We calculate a capitalized (intrinsic) value for each period, rather than aggregate a single value from all the periods. We use the same method

to calculate the value for each past year. Our research platform assumes confidence in the ability to estimate future values when past intrinsic values closely match actual prices. This raises the confidence level of the model in valuing the present and future. More accurate models tend to predict future price movements as the price migrates toward intrinsic value.

Using fade and a single-period method is more reliable than trying to test the impact of various variables on risk. Investors and analysts often apply a sensitivity analysis to these variables in seeking to identify the critical factors impacting the value of a business. Essentially, investors are using this technique to try to better understand the amount of uncertainty embedded in the variables identified by the model. Forget it: Rely instead on the fade technique for all firms.

STARTING WITH A BASELINE MODEL

In estimating a company's intrinsic value, it is our belief that every investor should start with a baseline model. It serves the useful purpose of evaluating the reasonableness of using discounted cash flow as the basis of your model.

Our recommended baseline model integrates a company's current and historical financial information with the comparable industry peer data, limiting analyst input to future sales and earnings estimates and industry/

company capital turnover. The cost of acquiring the data can be spread over calculations of a host of companies.

The model should be able to make both historical and future value

estimates. It is important to be able to apply the same valuation criteria in obtaining historical returns and in projecting future values.

The vital ingredient here: Our model enables comparing estimated future intrinsic values with actual prices to form the baseline to evaluate forecasts.

The advantage of the single-period method comes into play. Investors can avoid the need to do a DCF forecast every year by making fade adjustments instead to cover the interim period during which the company's value is becoming more stable. In fact, with the fade capitalization, you can generate single-point values for each past and future year.

We use a value chart (see Figure 27.1) to illustrate our method.

The dark line in Figure 27.1 represents the intrinsic value based solely on the most recent historical year. The white circles are the closing price for each year, while the white bars represent the high-low fiscal year prices.

The intrinsic value for the two 2005–2006 forecast years is based on

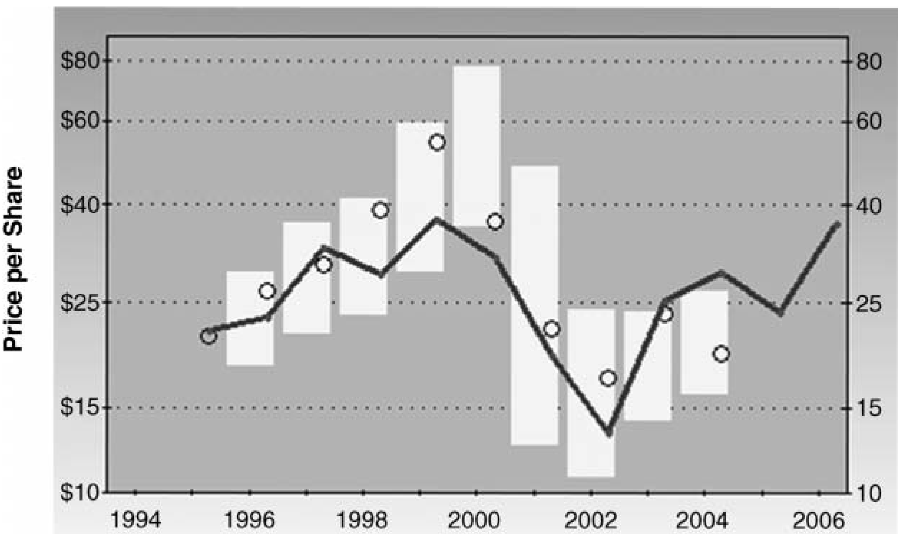


FIGURE 27.1

Intrinsic Value Chart Example

Source: This material is reproduced with the permission of John Wiley & Sons, Inc.

extrapolating data from the 2004 balance sheet and income statement and incorporates the analysts' forecasts of sales and EPS.

We prove our proposition through a graph comparing trading range and closing price of a company covering a fiscal year plus three months (see Figure 27.1). The dark black line connects single-period estimates made by the model. Investors can readily compare the model's result with actual price. This enables us to see how well the market recognizes the intrinsic value of the company. Remember, we said the market overvalues about half the stocks and undervalues the other half. The goal of investors and executives should be to bring the actual price closer to intrinsic value.

In 2000, price kept rising while the intrinsic valuation dropped. This divergence highlights a point to sell or short. The opposite occurred in 2003.

Cash economic performance improved, intrinsic valuation responded with higher values, and stock prices responded positively.

We have conducted extensive empirical analysis of the comparison between our calculations of intrinsic value and actual stock prices of a universe of over 7,000 companies. The small differences (shown in the graph) give us a good statistical confidence measure, enabling us to claim a method to empirically and mathematically test the accuracy of the model for each company. The lower the tracking error, the more accurate is the model.

As we have emphasized several times, more accurate models display lower risk to produce higher returns. For the mathematically inclined, tracking

error is defined as the difference between the intrinsic value IV for firm *i* at it

time *t* and the firms' price *P* normalized by price in Equation 27.4: *it*

Equation 27.4 Tracking Error Formula

$V - P$

$Error =$

it

it

Pit

For example, from visually inspecting our graph to approximately compare the line with the hollow circle for 2004: Equation 27.5 Tracking Error Example

$26 - 17$

$Error =$

$= 52.9\%$

17

We are heartened in our conviction of the greater reliability of the single-period model by the fact that the respected Value Line Investment Survey uses a capitalization model of cash flow (net income + depreciation) instead of multiperiod models. Indeed, many of the leading providers of economic, cash-based investment methods today now illustrate their models with value charts. These include the respected Credit Suisse,[9] HOLT,[10] the Boston Consulting Group, Applied Finance Group, Morningstar, Ativo, Charter Mast, and others.

We are big proponents of using value charts in making stock decisions and managing equity portfolios. The value charts function as a key element in buying and selling stocks as well as in strategic planning for companies.

Our comprehensive back tests suggest that excess investment returns occur as the stock price migrates toward intrinsic value over several quarters or years.

In most cases, the stock goes from being undervalued to being overvalued, or it moves from being overvalued to being undervalued. This reality only makes us more excited about helping build a market that succeeds in pricing most stocks close to their intrinsic value.

For over two decades, a firm familiar to many professional investors has been advocating a similar way of looking at intrinsic value as the

basis of making equity decisions. Stern-Stewart emphasizes the notion of a company earning a return higher than its cost of capital. It calls the difference excess return, while academics call it residual income.

9Formerly Credit Suisse First Boston.

10Named for the last names of the founders: Bob *H* endricks, Eric *O* lsen, Marvin *L* ipson, and Rawley *T* homas.

Corporate managements embrace the goal of earning excess returns.

Those of us in the cash flow camp believe returns above the cost of capital create wealth and returns below it destroy wealth. In our model, we view the difference between the intrinsic value estimation and actual stock price as a modeling error; our efforts are aimed at establishing the highest model reliance.

What we are focusing on here is the overriding fundamental notion that has taken on the popular phrase "shareholder value." Companies seek to continue a process of creating value for their investors. Investors seek to select companies continuing to create value. Value is defined in this case as the intrinsic value of the business. To the extent the actual market price reflects the intrinsic value, the company is being valued fairly (close to intrinsic value) by the market. To our knowledge, the LCRT model is the best methodology developed to date to determine a company's intrinsic value accurately. We make this bold statement because we know of no published research that employs the measures of robustness, accuracy, nonbias, and predictive capability in a comprehensive way.

IMPORTANCE OF UNDERSTANDING

ECONOMIC COMPARABLES

We offer an extra word about comparables. Economic comparables differ from those used in traditional, primarily accounting-based models.

Using economic comparables, companies are analyzed and compared with one another on the basis of cash economic returns, size, asset life, leverage characteristics, and asset mix between depreciating and nondepreciating assets. In analyzing companies over a long time period—say, a decade—it is possible to come up with anywhere from 50 to 200 economic comparables and generate a range of values.

Indeed, the LCRT model shows unbiased intrinsic values that demonstrate the market reality of half the universe of companies being undervalued and half being overvalued. Again, we point out that there are times when some huge macro event or combination of events drive the market in general to be over-or undervalued.

And it is within this reality that opportunity exists for the investor using this methodology. If you own stocks that are overvalued, sell them. The market soon will realize its exuberance or ignorance and begin selling those stocks. Use that money or add some more to buy stocks that our model shows to be undervalued. The market soon will realize these companies are undervalued, begin buying shares, and push up the price.

THE DIFFERENCE BETWEEN NET FREE CASH FLOW VERSUS CASH ECONOMIC RETURN

We have noted that net free cash flow has its weakness, and our LCRT model instead uses cash economic return as the driver in calculating intrinsic value. It's time to dig into this debate some more.

Our model determines the capitalized or intrinsic value of a security and the amount of difference between that value and the current stock price.

Six value factors comprise and drive our model. We are sure these words are familiar ones. The key will be to explain completely what they mean in the context of our model.

The six are:

1. Cash economic return.

2. Value multiplier (traditionally 1/(discount rate − growth rate)).

3. Fade.

4. Perpetuity assumption.

5. Spot intrinsic value (an intrinsic value in the past based purely on cash flow forecasts relying only on historical financial statements

without analyst intervention).

6. Price difference and percentage of over/under intrinsic value.

Please note, with the value multiplier, we replace the traditional 1

divided by the discount rate minus the growth rate by an explicit 50-year forecast of constant dollar net free cash flows.

We explain each value factor. Net free cash flow is the cash inflow left after using cash for changes in working capital and capital expenditures.

It also represents the theoretical dividend-paying capacity of the company.

Many investors like to use the cash-based dividend discount model.

Most investors' models use sales growth rates, margins, and capital turns to drive net free cash flow. Not our model. We make important adjustments to the conventional measure of net free cash flow. In contrast, our primary value drivers are cash economic return and a sustainable growth rate.

We transform the cash economic return and sustainable growth rates into certainty-equivalent market-expected constant dollar net cash flows.

Now that's quite a mouthful, isn't it. It simply means what investors collectively expect the company to generate in actual cash flow available for continuing investment.

Our fade methodology comes into play here as well. We use fading growth rates to drive asset levels and fading cash economic returns to drive gross cash flows, the latter being net income plus depreciation.

COMPARING CONVENTIONAL AND LCRT MODELS

We continue describing our six major value factors. By comparing the conventional model and LCRT model, we can better see the differences.

First is the discount rate. The 1 divided by the discount rate minus the growth rate is the conventional capitalization method, in widest use today. In this free cash flow model, the discount rate is built up,

typically by employing CAPM (capital asset pricing model), applying a unique risk level for each company, known as its beta. This is the risk caused by market uncertainty.

A higher beta says the market is placing a higher level of uncertainty.

In contrast, our discount rate reflects the universe of stocks and is the same for all of them. Essentially, our fade calculation replaces many of the risks traditionally placed in the discount rate. We also adjust the cash flows for any expected losses from excess debt. We believe it is fade and other key adjustments that matter. These adjustments place traditional risk into the certainty-equivalent cash flow forecasts built into the model. Traditional risk in our model is no longer in the discount rate.

Next is the growth rate. Investors using conventional models select a growth rate, usually based on a combination of recent past performance and forecasts. The investor may decide on a changing growth rate of the cash flows in going from the near term to an intermediate period, say, 10 percent for the next two years, coming down to 8 percent and then 7 percent over the three years after that. Then, the level of growth is normalized into a single rate in estimating the terminal value of the net free cash flows projected into perpetuity. That terminal value remains a stable return for the remaining life of the business. To wit: For the next 50 years, the company is going to have an average 5 percent annual growth.

Our LCRT model works quite differently. Our purpose is to adjust for risk in forecasting cash flows. In our fade methodology, we are able to develop growth rates from historical performance covering revenue forecasts and assets from cash available for reinvestment. The fade for a company begins with its starting growth rate. It fades over time, becoming a long-term growth rate that is designed to mirror the overall real GDP growth of the economy. Remember, a company's growth can fade down or up.

Mathematics built into our model determine the amount of fade or change, in moving from the present to the normalized long-term state of returns. This is quite different from popular DCF models that use subjective inputs of the investors and analysts. We begin by determining a sustainable real growth rate after paying dividends and making investments to replace plant and equipment. Yes, that likely goes right to the essence of what is happening in the business. Examples include such activities as upgrading to a whole new technology platform or building a new production line for cars or

engines or tractors or jet planes.

Over decades now, the real growth rate of the U.S. economy has come out to be about 3 percent a year. While most years the rate varies fractionally, it is a consistent amount over time. We have validated empirically the use of this amount in our model. Thus, we program our model to fade the starting growth rate of all companies toward the 3 percent real growth rate of the economy. The model refines this rate through a proprietary function that takes into consideration the size of the company. Of course, the performance of the economy lately is challenging this 3 percent level—unfortunately on the downside.

We also are more practical in our assumptions of how long a company exists, using a 50-year lifespan for generating cash flows, rather than a perpetuity. What is perpetuity, anyway? One hundred years? Few companies existing a century ago are still around today.

The spot intrinsic value is an important feature of the model. It represents the current-year intrinsic value based on the cash economic return for that particular year. Our model delivers spot intrinsic values for up to 10 years, going back and forward, using the single-period procedure.

Extending our prior example of constant dollar net free cash flows, we calculate a spot intrinsic valuation for 2000 in Table 27.5.

In Table 27.5, the present value of cash flows for the next 50 years forms the $80,516 billion enterprise value. Add nonoperating cash, subtract debt, and divide by shares outstanding to produce $28.93 spot intrinsic value per share.

It is interesting to look at this feature as a formula. Spot intrinsic value minus stock price equals price difference. Is the company presently over-or undervalued? Or, much less likely, fairly valued? Price difference divided by spot intrinsic value equals the percentage of under-or overvaluation: Equation 27.6 Signed Tracking Error

$$\frac{28.93 - 39}{39} = -25.8\% \Rightarrow \text{Negative sign means } \textit{over-valued}$$

With an accurate intrinsic valuation model and other things being equal, the above example suggests that shorting the stock could produce a TABLE 27.5

Equity Intrinsic Value vs. Stock Price

Present Value of Cash Flows

$80,516

Cash – Debt

$ 3,687

Equity Intrinsic Value

$84,203

Number of Shares Outstanding

2,911

Equity Intrinsic Value Per Share

$ 28.93

Price

$ 39.00

25.8 percent return as the price migrates down from $39 to $28.93. By shorting the stock, you are buying it later at $28.93 and shorting it now at $39. Our margin investment to borrow is the stock at $39.

VALIDATING THE MODEL: THE PROOF IS IN THE

COMPARISON

Our intent is to eliminate your skepticism about our methodology and model. We don't want skeptics among our readers; indeed, we're hoping to build an army of believers.

So, we need to pile up as much empirical evidence to bolster the model as possible. We are setting out to show empirically the accuracy of the model in calculating a company's intrinsic worth in determining if it currently is being over-or underpriced by the stock market.

An excellent way to show the LCRT model's accuracy is to compare it against a traditional net free cash flow model. The best one is 8 x

EBITDA.

Why? Because 8 x EBITDA is an excellent model to estimate net free cash flow. It is a single multiple that closely resembles the long-term median of EBITDA multiples. At the same time, we want to compare our model's fade capitalization process based on cash economic return. We are making these comparisons for a single company and for its entire supersector universe.

Importantly, these comparisons illustrate an empirical research process for testing models and thus, improving DCF valuations. The value chart here compares the annual spot intrinsic values of one company for the three capitalization models covering one year.

Your opportunity to become more expert in understanding the comparisons of these models can be achieved by reading Chapter 5, "Developing an Automated Discounted Cash Flow Model" by Robert J. Atra and me in *The Valuation Handbook*, published in 2010 by Wiley Finance.

Let's explain Figure 27.2. The absolute tracking error for the net free cash flow model equals 37.4 percent. With this model, we are growing free cash flow for T years and capitalizing the terminal year's free cash flow into perpetuity. Let's look at the formula in an example in Table 27.6.

The terminal year's cash flow is capitalized by a median industry CAPM

nominal discount rate less a nominal growth rate.

CALCULATION OF TRACKING ERRORS

Now is a good time to provide an arithmetic example of the precise calculation of tracking errors. Both the absolute and signed tracking errors

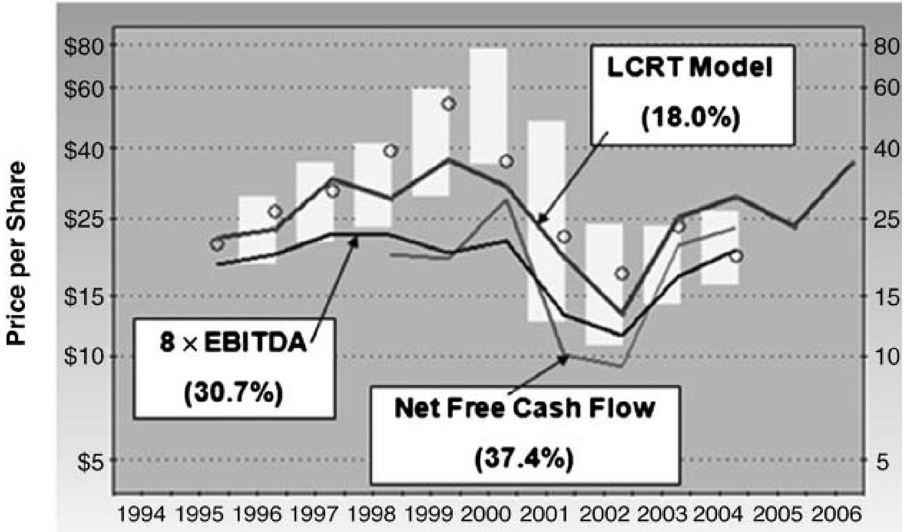


FIGURE 27.2

Comparing Three Models

Source: This material is reproduced with the permission of John Wiley & Sons, Inc.

TABLE 27.6

Net Free Cash Flow

Net Income	$204,104
+ Depreciation	$ 22,772
+ Working Capital Decreases	$ 51,587
– Capital Expenditures	$ (34,809)

= Net Free Cash Flow

$243,654

are 10-year geometric means of the percent difference between the intrinsic value and the stock price at fiscal year plus three months. The intrinsic value is calculated from the fiscal year financial statements. Three months represents the normal disclosure lag for submitting financial statements to the SEC. Following is the precise calculation for measuring this most important concept of model measurement error.

To calculate the geometric mean, we first add 1 + (intrinsic value less the price over the price). Here is the formula in Equation 27.7 for 2000 as calculated in Table 27.7, "Illustrative Calculation of Tracking Errors": Equation 27.7 Geometric Mean Tracking Error

$$1 + Error_{it} = 1 + \frac{IV - P}{P_{it}} = 1 + \frac{21.19 - 21.89}{21.89} = 0.97$$

After calculating 1 + percent difference or 1 + absolute percent difference for each year, we calculate the product for all years. For signed tracking

TABLE 27.7

Illustrative Calculation of Tracking Errors

Signed Tracking

Absolute Tracking

Error Calculation

Error Calculation

Intrinsic

Price @Fiscal Year

1 +

1 + Absolute

Year

Value

+ 3 Months

% Difference

% Difference

2000

21.19

21.89

0.97

1.03

2001

26.31

23.27

1.13

1.13

2002

30.06

32.53

0.92

1.08

2003

39.19

28.61

1.37

1.37

2004

54.13

37.26

1.45

1.45

2005

36.85

31.09

1.19

1.19

2006

22.11

19.37

1.14

1.14

2007

17.41

13.34

1.30

1.30

2008

23.79

25.35

0.94

1.06

2009

19.59

28.93

0.68

1.32

Product of 1 + % Difference

for 10 Years

2.26

6.19

Tracking Errors

(10th Root of Product − 1) * 100%

8.49

20.01

Signed Tracking

Absolute Tracking

Error

Error

errors, the product is 2.26. For absolute tracking errors, the product is 6.19.

Taking the 10th root of these two numbers produces a geometric mean 8.49

percent signed tracking error and 20.01 percent absolute tracking error.

Recall that the signed tracking error tells us if the model is consistently above or below the price. The absolute tracking error tells us how accurate the model is.

The absolute tracking error for the simplistic 8 x EBITDA multiple is 30.7 percent, somewhat lower and therefore more accurate than the net free cash flow model. That probably will surprise some readers who are followers of net free cash flow.

Since the non-LCRT models consistently undertrack the actual prices, we become suspicious that their negative bias indicates poor model specification and likely less ability to predict future price movements. Put another way: A model that always tells you to sell is not useful. Neither is a model that always tells you to buy. You want a model that clearly distinguishes buys from sells and shorts. Accurate intrinsic valuation models perform this separation task very well. And, as we will show in Chapter 29, “Producing Lower Fat-Tailed Risk with Higher Returns,” these models also tend to produce lower risk.

TABLE 27.8

Absolute Tracking Errors of

Three Models

LCRT

18.00%

8 x EBITDA

30.70%

Net Free Cash Flow

37.40%

What is important here is to recognize that we have created an empirical tool to measure the lack of reliability of a popular earnings-based valuation model. High tracking errors confirm the EBITDA's lack of reliability.

Conceptually, this lack of reliability relates to EBITDA's sole focus on earnings instead of also addressing the balance sheet's importance.

The absolute tracking error for the LCRT fade capitalization model is 18.0 percent.

Table 27.8 displays all the absolute tracking errors.

We certainly realize that a test of one company doesn't convince each and every one of you of the reliability of our empirical evidence.

In our ValuFocus database, we display the results of five models applied historically on up to 7,000 companies for the last 10 years. Each company has an individual intrinsic value chart.

We also have proven empirically that the LCRT fade capitalization model is the most accurate among the three basic methods in showing the absolute difference between stock prices and the companies' intrinsic values.

This is as critical a finding as any in the entire process.

Accurate calculations of a company's intrinsic value form the basis to make good investment decisions. Investors have much more confidence in selecting stocks that the market presently is underpricing and selling those being overpriced. Plus, the intrinsic value readings showing a company that is fairly priced at the moment suggests that further analysis and introspection are needed to be sure fundamentals and prospects are ensuring increases in shareholder value going forward.

We can assess the reliability of the model by comparing the percentage of under-or overvaluations in the market at any time against the comparison of historical intrinsic values to actual prices. We form an empirical baseline by determining the percentage

differences between spot intrinsic values and actual prices. This gives us a confidence level, which is measured by tracking errors.

We like to use a metric that investors readily recognize: EBITDA, or earnings before interest, taxes, depreciation, and amortization. It is among the most popular metrics used by earnings advocates. They believe in its reliability. We select a multiple that can be used to estimate value, an appropriate one being 8 x EBITDA—with eight times being a median in a long period.

100

Cumulative % of

3,600 Industrial Firms

Universe

90

2001-2007

Panel Data

80

70

60

Life Cycle Model

50

8 X EBITDA

40

Residual Income

30

Net Free Cash Flow

20

10

0

4

2

4

8

16

32

64

128

Log to Base 2 of % Absolute Model Tracking Error Using Price at Fiscal Year + 3 Months to Reflect Disclosure lag FIGURE 27.3

Comparison of Capitalization Models: Tracking

Errors

Next, we apply the multiple to a large pool of similar stocks based on their historical price levels. We compare those prices with the intrinsic value calculations from our LCRT model. If the differences are small, 8 x EBITDA becomes a good metric. However, the differences may be small on occasion but not consistently for the entire market and over time. Large differences call for using a better model. Ours.

Our data used as the basis to demonstrate the relative accuracy of the LCRT model in linking intrinsic value to actual stock prices versus the net free cash flow, residual income, and 8 x EBITDA methods are quite definitive. Our work covers analysis of some 3,600 industrial companies.

The study period is 2001–2007, which, as you can see, is a sizable length of time in achieving accurate results. The model with the lowest tracking error is the most accurate. We show the results in Figure 27.3.

By way of explanation, the horizontal x-axis measures the log to the base 2 of the absolute model intrinsic value tracking error versus the

actual stock price. The y-axis measures the cumulative percentage of the universe.

The most accurate models are up and to the left, displaying the lowest tracking errors. The least accurate models are down and to the right, with the largest tracking errors.

Results: The median tracking errors are 167 percent for net free cash flow, 72 percent for 8 x EBITDA, 66 percent for residual income, and 47

percent for the LCRT fade capitalization model.

Interestingly, the 8 x EBITDA model is more accurate than the net free cash flow model. EBITDA is also more accurate than residual income for a significant part of the universe. That probably explains why security analysts and portfolio managers prefer simple multiples over DCF net free cash flow valuation models. But our LCRT fade capitalization model tops them all.

These comparisons establish an objective empirical research process for testing models and improving DCF-based valuations.

FOCUSING ON CASH ECONOMIC RETURN

Before we can get you fully on board, we need to prove to you that cash economic return is the more reliable base metric versus net free cash flow.

In valuing a company on the basis of economics, namely, cash flow, investors are looking for excess returns on investment. For us, that more accurately resides in the cash economic return than in net free cash flow.

Fundamentally, what we all are trying to understand and calculate as accurately as possible is the internal rate of return (IRR) of the business enterprise. Company executives and investors alike accept that return as the most basic measure of the profitability of a business. It has long the practice of financial executives to calculate the IRR of each project (estimated before, during, after, and continuing) as well as the business in its entirety.

Figure 27.4 illustrates the internal rate of return (IRR) on a project.

It is virtually impossible to calculate the IRR using accounting techniques. It must be done on an economic basis. Accounting returns simply are not accurate enough to be satisfactory. We can cite study after study and paper after paper showing the difficulty in relating economic to accounting returns. If you would like to have the proof directly, we refer you to classic articles of the 1970s and 1980s written by Ezra Solomon,[11] Gerald Salamon,[12] and Richard Brief.[13] For a most relevant recent article, please see Carlo Alberto Magni.[14]

11Ezra Solomon, "Return on Investment: The Relation of Book Yield to True Yield,"

Research in Accounting Measurement, American Accounting Association, 1966.

12Gerald L. Salamon, "Cash Recovery Rates and Measures of Firm Profitability,"

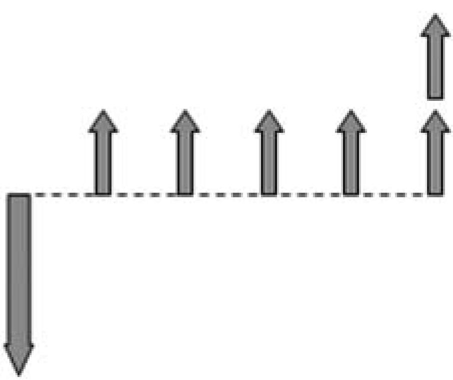
The Accounting Review, April 1982, pp. 292–302.

13Richard P. Brief, *Estimating the Economic Rate of Return from Accounting Data* (Garland Publishing, 1986).

14Carlo Alberto Magni, "Average Internal Rate of Return and Investment Decisions: A new perspective," http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1542690.

Date posted: January 27, 2010; last revised June 14, 2010; also, *The Engineering Economist,* Vol. 55, No. 2, pp. 150–181.

(*Continued*)



Another Tour through Our LCRT Model

Liquidate

Gross Cash Flow

Assets

Purchase

Assets

Return on Investment

Internal Rate of Return of

Cash-Out and Cash-In flows

FIGURE 27.4

Internal Rate of Return on a

Corporate Investment Project

Source: This material is reproduced with the permission of John Wiley & Sons, Inc.

These authors have shown that such measures as annual accounting rates of return (ARR), return on equity (ROE), return on net assets (RONA), return on capital employed (ROCE), and return on assets (ROA) do not reflect the economic or internal rate of return.

To reflect the IRR with RONA, output needs to decline with increases in accumulated depreciation. If that is true, RONA compares directly to the cost of capital. Such metrics as CFROI (cash flow return on investment) (*Note Continued*)

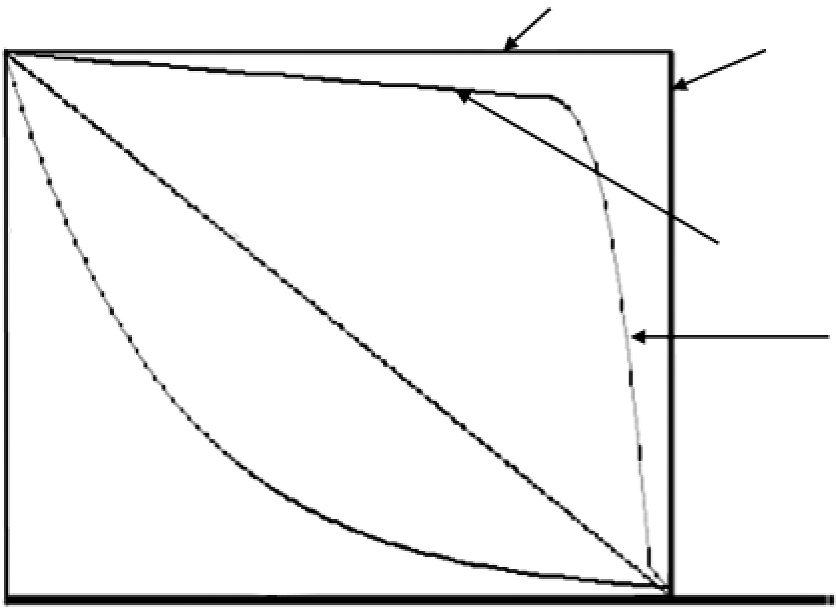
Abstract: The internal rate of return (IRR) is often used by managers and practitioners for investment decisions. Unfortunately, it has serious flaws: (i) multiple real-valued IRRs may arise, (ii) complex-valued IRRs may arise, (iii) the IRR is, in general, incompatible with the net present value (NPV) in accept/reject decisions (iv) the IRR ranking is, in general, different from the NPV ranking, (v) the IRR

criterion is not applicable with variable costs of capital. The efforts of economists and management scientists to provide a reliable project rate of return have generated over the decades an immense bulk of

contributions aiming to solve these shortcomings.

This paper offers a solution to this long-standing unsolved issue by changing the usual perspective: The IRR equation is dismissed and the evaluator is allowed to describe the project as an investment or a borrowing at his discretion. This permits it to show that any arithmetic mean of the one-period return rates implicit in a project reliably informs about a project's profitability and correctly ranks competing projects. With such a measure, which we name "Average Internal Rate of Return," complex-valued numbers disappear and all the above mentioned problems are wiped out. The economic meaning is compelling: it is the project return rate implicitly determined by the market. The traditional IRR notion may be found back as a particular case.

This material is reproduced with the permission of Carlo Alberto Magni.



(1) Constant Output = Constant Dollar Level Annuity Failure (One-Horse Shay)

(3) Straight-Line Depreciation Net Plant

(Economic Value Added Implicit Assump

(4) Accelerated Depreciation Net Plant

(2) Most Assets Produce

Nearly Level Output...

Output

Until Failure

tion)

Time

Economic

Life

FIGURE 27.5

Output from Assets under Different Assumptions *Source*: This material is reproduced with the permission of John Wiley & Sons, Inc.

and CER (cash economic return) remain reasonably stable before they stop.

Academics label this reality a "one-horse shay."

Economists agree that five prime factors make up the difference in economic and accounting returns: the pattern of cash flows within a project; the depreciation method; the growth rate of each project; the project life; and inflation. Bringing all these determinants together builds a problem that is pragmatically impossible to solve.

Instead, we start with a simple assumption that can be justified: Most assets produce constant output. Makes sense, doesn't it? Then, we follow a constant dollar level. This enables us to create an annual performance measure: gross cash flow return on gross assets with a finite life. This measure equals the economic or internal rate of return of all underlying projects. Figure 27.5 illustrates this constant output assumption.

Extensive studies show that cash economic return minimizes distortions from inflation found in traditional accounting measures and reflects the average internal rate of return from business projects.

Here we are summarizing from studies done by Bart Madden, described in his book, *CFROI Valuation: A Total System Approach to Valuing the Firm,* and an article by Yuji Ijiri that appeared in the March 1980 issue of *Financial Executive*.

With our model, we are translating cash flows from the income statement and balance sheet into units of the same constant-dollar purchasing power. In this way, the model is giving us returns on investment in the same

TABLE 27.9

Annual Performance Measure of a Project

Annual Performance Measure of Project

Year

1

2

3

4

5

6

7

8

Income

500

500

500

500

500

500

500

500

Depreciation

1,250

1250

1250

1250

1250

1250

1250

1250

Gross Cash

1,750

1,750

1,750

1,750

1,750

1,750

1,750

1,750

Flow

Gross Plant

10,000 10,000 10,000 10,000 10,000 10,000 10,000 10,000

Accumulated

1,250

2,500

3,750

5,000

6,250

7,500

8,750 10,000

Depreciation

Net Plant

8,750

7,500

6,250

5,000

3,750

2,500

1,250

0

Return on Net

Assets =

RONA =

5.71% 6.67% 8.00%10.00%13.33%20.00%40.00%

∞

Income / Net

Plant

Cash

8.00% 8.00% 8.00% 8.00% 8.00% 8.00% 8.00% 8.00%

Economic

Return

(CER)

Difference

−2.29% −1.33% 0.00% 2.00% 5.33% 12.00% 32.00% ∞

Return on

17.50% 17.50% 17.50% 17.50% 17.50% 17.50% 17.50% 17.50%

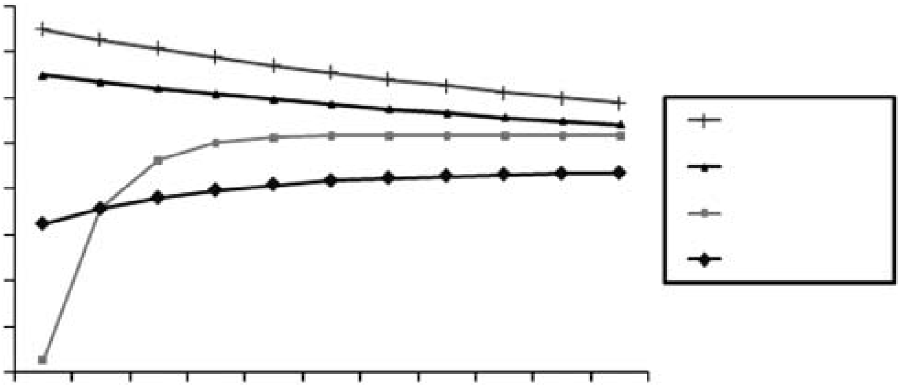
Gross Assets

Source: This material is reproduced with the permission of John Wiley & Sons, Inc.

purchasing units. So, by assuming constant output from the fixed assets, the returns are more realistic than those simple measures of return on net assets.

To illustrate these principles, see Table 27.9. Consider a project consisting of a depreciating asset costing $10,000, which produces cash flows of $1,740 for eight years with no salvage value. This project produces an internal rate of return (IRR) of 8.00 percent. Assume for the moment that there is no inflation. The table displays the project and the accounting for each year. The income is constant, but the net plant declines from $8,750

in year one to zero in year eight. The return on net assets (RONA = net income/net plant) begins at 5.71 percent in year one, rises to 40 percent in year seven, and becomes infinite in year eight. Only in year three does the



RONA precisely equal the 8 percent IRR economic rate of return known for the project.

With inflation, the RONA bias becomes worse, as cash flows tend to rise with the price level, while the historical dollar net plant declines with depreciation accounting.

The annual performance measure, the cash economic return (CER), explained in detail in a following section, precisely equals the 8 percent economic return each and every year, because it relates the gross cash flow to the gross assets over the eight-year life as an IRR calculation. Another simplified annual performance measure, return on gross assets (ROGA =

gross cash flow/gross plant), remains constant at 17.5 percent and avoids the upward bias of RONA.

CALCULATING AND DELVING INTO CASH

ECONOMIC RETURN

For all this to make sense, and to make our case for cash as strong as possible, it is vital that we differentiate between cash economic return (CER) and traditional accounting return measures.

This is how we turn accounting to cash in Figure 27.6.

First, we want to point out the five major differences between CER and those old standard accounting return measures.

Five symmetrical adjustments to traditional financial statements produce the prime elements of our LCRT cash economic return: **1.** We eliminate nonoperating items.

2. We translate cash primarily by adding back depreciation and amortization, and accumulated depreciation.

80

60

40

Small High

20

Large High

0

Small Low

−20

Large Low

−40

−60

Cash Economic Return −80 0 1 2 3 4 5 6 7 8 9 10

Year

FIGURE 27.6

Cash Economic Return Example

Source: This material is reproduced with the permission of John Wiley & Sons, Inc.

3. We restate for inflation.

4. We eliminate leverage effects.

5. We capitalize expenses.

We can show you all of this in an example. The company is SuperValu, the major grocery store chain, headquartered in Minneapolis. This example explicitly illustrates the adjustments necessary to produce the numerator and denominator of the cash economic return (CER) calculation. We must urge you to take some time to study it carefully.

We start by charting the details of the cash economic return for SuperValu in 2001. All the numbers we are using in this example come from the company's financial statements. We transform $206 million in income and $5,825 million in assets into $781 million of gross cash flow and $5,704

million of gross cash investment. All of these numbers are expressed in the same units of investor purchasing power, namely, current 2001 dollars.

There is much here to explain.

1. First, we make symmetrical adjustments that focus on the results of operations in (A) adjustments to both the income and the balance sheet.

To income (A), our model adds $33 million in extraordinary items after tax and subtracts $16 million in nonoperating expenses.

2. To assets (A), our model subtracts $137 million of nonoperating assets and $1,531 million of purchase goodwill.

3. In income (B), noncash charges of $333 million in the numerator consist of depreciation, amortization, and changes to the allowance for doubt-ful accounts. In turn to the balance sheet (B), we add back reserves for receivables of $23 million, LIFO (inventory), and accumulated depreciation of $1,580 million to return us to the original cash investment in the denominator assets.

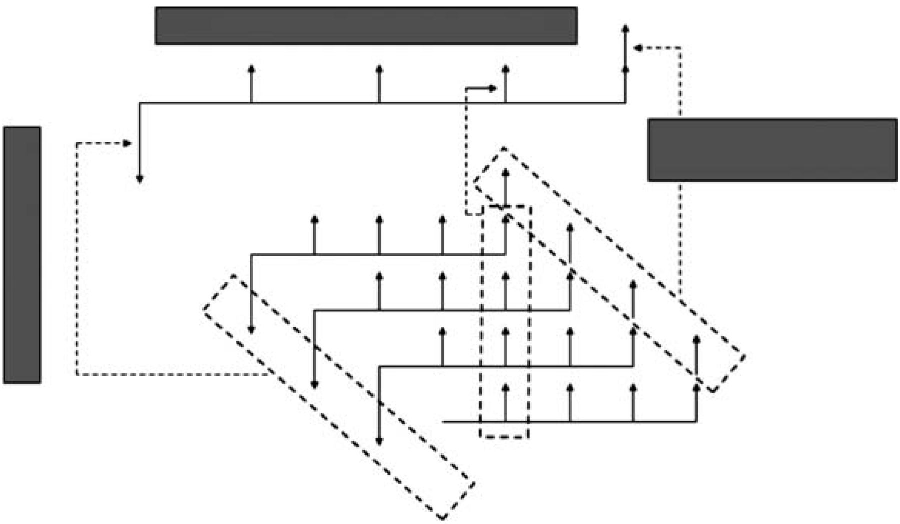
4. Now we must reflect inflation and restate all historical dollars to 2001

dollars. Two key calculations come into play here. First, in income (C), our model computes a $14 million gain on nonfixed assets in the numerator. How do we get that amount? Here is our formula: A GDP

deflator change times nonfixed assets minus payables and other

nondebt liabilities exceeds assets of receivables, operating cash, investments, and other assets.

5. Second, in the balance sheet (C), we have a $249 million adjustment to land, gross plant, and deferred taxes in the denominator. We have determined that we can restate the historical cost for plant to current dollars by using the plant life and age. We don't even need the company's financial data to do so. In fact, we have tested our algorithm against company data. Over and over again, we find that the algorithm is accurate within 5 to 10 percent. The only exceptions were when capital



expenditures were well above normal for the company in the last one or two years.

6. Next, to the balance sheet (D), we capitalize $1,202 million of operating leases in the denominator. Then we add back in income statement (D) $134 million of after-tax interest on debt and leases and also the $77

million principal portion of rental payments to the numerator. This frees the measure from any financial leverage.

7. In this time frame, SuperValu doesn't disclose advertising and R&D.

In our model, we would capitalize these elements in the denominator,

while adding back the after-corporate-tax effect in the numerator.

8. Last, our model subtracts $1,648 million of non-interest-bearing liabilities in the balance sheet (F). Why? We must reconcile our calculation to the cash investments made by the equity and debt holders and landlords.

We have made the case loudly in this book for viewing the cash economic return (CER) as the internal rate of return (IRR) of a business. We are saying that the aggregate cash economic return is the combined return of all of a company's projects, and thus the aggregate CER is the equivalent of the average IRR of all projects in place. We can show this reality graphically for a company investing in four projects in Figure 27.7.

The sum of the down arrows of the four project investments produces the gross investment, namely, the total cash invested by the company. The total of the project cash flows (up arrows) equals the gross cash flows (up arrows) from operations. The sum of the released nondepreciating assets Cash Flow from Operations

Release of

Nondepreciation Assets

estment in AssetsvIn

FIGURE 27.7

The Firm's Cash Flows from Several Projects

Source: This material is reproduced with the permission of John Wiley & Sons, Inc.

from each project comprises the final up arrow in the down arrow/up arrows in the top of Figure 27.7.

Here we come to an important difference in our model. The gross or total CER equals the internal rate of return of all four projects, irrespective of the growth rate of investment or a variable inflation rate. The cash economic return and IRR differ substantially from traditional accounting return measures that use net book value because the CER is computed from gross investment and doesn't use depreciated or amortized values.

Accounting returns on depreciated book values virtually always are less than cash economic returns with new assets and sizably higher with older assets. The main reason: Depreciated book value declines with age.

Well, what about depreciation and inflation? They are important.

Indeed, at this point, we do have an incomplete picture. The gross economic return does not allow for inflation and depreciation. Investors often don't incorporate them, but our model does. It calculates these factors mathematically, based on historical financial reporting.

First is inflation. There are two ways to think about it. One way is to determine replacement cost of the assets. The other makes allowances for changes in the purchasing power, regardless of replacement costs. That's what we do in our model. We incorporate the U.S. government reported gross domestic product deflator for each year as a constant. This provides a consistent view of invested dollars across investments.

Next is depreciation. We have a computer module in our CapEx model that estimates the approximate past real growth rate of capital expenditures over the years, using information from the company covering original fixed asset cost (or gross plant), annual depreciation, and accumulated depreciation. We use an inflation measure based on the national deflation index for the most recent reporting period. Yuji Ijiri recommended the national deflation index as more representative to investors' loss of purchasing power than replacement cost or the consumer price index.15

Multiplying a year's historical dollar capital expenditure by the terminal year's GDP deflator and dividing by the GDP deflator for that year produces current dollar capital expenditure:

For 2000, see Equation 27.8:

Equation 27.8 2000 CapEx Expressed in 2005 Dollars $72 = 57 \times 100.00 / 79.06$

15Yuji Ijiri, "Recovery Rate and Cash Flow Accounting," *Financial Executive*, March 1980, pp. 54–60.

TABLE 27.10

Plant Inflation Adjustment Example

	Historical	Terminal	Current	
Calendar Year	**Dollar CapEx**	**GDP Deflator**	**GDP Deflator**	**Dollar CapEx**
2000	57	100	79.06	72
2001	62	100	82.54	75
2002	68	100	86.79	78
2003	74	100	91.45	

81

2004

81

100

96.01

84

2005

87

100

100.00

87

Total

429

477

As illustrated in Table 27.10, this procedure restates the $429 of total historical dollars of capital expenditures into $477 of total current dollar capital expenditures in 2005.16

Now why is all this better? Essentially, we are correcting for the deficiencies of the balance sheet. The balance sheet is the key data source in calculating cash economic return, just as it is in figuring out net free cash flow. But it is a tricky information resource to work with. Company-reported balance sheets include historical carried costs that cause significant distortions. The main culprits result from accountants' decisions regarding depreciation and amortization and the effects of inflation.

Our model works differently to overcome these distortions. So by the time we're done, the distortions are eliminated in our model but remain in those using net free cash flow. Fundamentally, we seek a cash on cash return—a cash flow on cash investment return. We accomplish this by adjusting the balance sheet to current dollars. This is done by restating the cost of past purchased fixed asset investments

to reflect the inflation that has occurred since the investments were made. As you can see, we don't use replacement cost analysis, because investors care what cash they place in the firm, not what assets the firms might buy currently. Please see Ijiri's explanation of this important conceptual point.

We're not done yet. In Figure 27.8, the ratio of $781 million gross cash flow to $5,704 million current dollar investor gross cash investment still 16For more information on this technique, please see Bartley J. Madden, *CFROI Valuation: A Total System Approach to Valuing the Firm* (Butterworth-Heinemann, 1999), Appendix B: Inflation Adjustment Factors, pp. 253–254.

Nondepreciating

Current-Dollar Gross Cash Flow

Asset Release

$781

$727

($5, 704)

Years

IRR

Current-Dollar

Economic Life: 11.55 Years

Investor Gross

11

8.62

Cash Economic Return — IRR: 9.09%

Cash

12

9.48

Investment

11.55

9.09

FIGURE 27.8

Cash Economic Return Example

Source: This material is reproduced with the permission of John Wiley & Sons, Inc.

isn't a proper return measure. It erroneously assumes the assets last forever.

We need to reflect the finite life of these depreciating assets. To do so, our model transform**s** the cash economic return into a projected 9.09 percent internal rate of return format. Here's how.

The $5,704 million down arrow reflects the current dollar investor gross cash investment expressed in 2001 dollars. The up arrows of $781 million reflect the current dollar annual gross cash flow available to all investors and to the company for reinvestment. Life equals a weighted average of the operating leased asset life of 15 years and the plant life from gross plant/depreciation.

All these are estimates, of course. The trickiest one is plant life. Investors are on notice to develop the most accurate estimates possible of the cash flows to be generated by the assets over their economic lives. In the same vein, it also is important to make the proper fixed asset inflation adjustment.

Of all the HOLT Planning and BCG consulting assignments, we spent the most time and energy trying to refine estimates for the plant economic life, age, and associated inflation adjustment. In one case, we went back to the 19th century. Despite these challenges with internal company data, we were astounded at how often our estimating procedures from public data mirrored the results from company fixed asset records. For security analysts, comparing plant lives across firms within the industry may be the easiest way to refine these adjustments from public data.

Our calculation involves a company achieving a 20.17 percent cash

economic return in the first year of our analysis in the example in Table 27.3,

"Gross Cash Flow." This rate can be determined in either of two ways. We divide gross cash flow less sinking fund depreciation by the gross investment. Or, we calculate the internal rate of return (IRR) of gross cash flow against gross investment over the asset life while releasing nondepreciating assets.

For companies with positive gross cash flows, either method is fine. They produce parallel answers. For companies with negative gross cash flows, the IRR calculation fails. This often applies to startups and companies in severe financial distress.

Thus, we use the ratio version so we can cover the whole universe.

Table 27.11 is an arithmetic example of the ratio CER version compared to the IRR version.

UNDERSTANDING THE GROWTH RATE

Next, we take a closer look at the growth rate. Typically, it focuses on revenue growth. This certainly is the case with DCF and capitalization models. Models in these groups start with the multiperiod method in stabilizing capital structure and margin returns, which leaves revenue growth in synch with profit growth and the balance sheet. Once stable, value readings follow the capitalization model into perpetuity. These models also depend on traditional asset ratios to determine if there is enough cash coming in to finance expected growth and maintain borrowing capability.

We replace the multiperiod model with our fade capitalization value method, covering each year. We factor in an inflation adjustment for both fixed assets and cash economic returns. Our model integrates the fading growth rates—could be up or down—of gross assets and cash economic returns to bring about a change in constant dollar net free cash flows.

A sustainable growth rate is determined by the model mathematically.

Like traditional DCF models, the purpose here is to make sure there is enough cash flow to pay for expected growth. Early on, a company

may have a sustainable growth rate that is higher or lower than the average in the industry or economy. Over time, our LCRT model assumes a growth rate comparable to the real 3 percent economy growth rate.

This computer program subtracts replacement capital spending and dividends from gross cash flow, and then divides the gross assets to obtain a long-term sustainable growth rate.

Table 27.12 illustrates the sustainable growth rate.

In sum, our model is using cash economic returns, growth in constant dollar gross assets, and replacements of depreciating assets to produce real net free cash flows. Thus, we are using cash economic returns and gross asset growth rates as the primary value drivers instead of sales growth rates and net free cash flow. We have eliminated the distortions to income, such as depreciable asset changes, that result in erroneous balance sheet values.

TABLE 27.11

Ratio CER versus IRR CER

HPQ—Hewlett Packard Company

Ratio CER

IRR CER

Variable Name

2008

2008

Asset Life – Weighted Average – Plant & Leased Assets 5.471

5.471

Depreciating Assets – Current Dollar

15,576.338

Sinking Fund Factor

.151

Depreciation – Sinking Fund

2,353.782

2,353.782

Working Capital – Operating Current Dollar

2,155.597

Monetary Assets – Net Long Term

32,191.000

Nondepreciating Assets – Operating Current Dollar 34,886.621
34,886.621

Depreciating Assets – Current Dollar

15,576.338

Gross Assets – Operating Current Dollar

50,462.959 50,462.959

Depreciation Used

3,356.000

Amortization of Goodwill

967.000

Inflation Gain or (Loss) on Operating Working Capital (186.788)

Inflation Gain or (Loss) on Monetary Assets – Net (837.033)

Long Term

– Depreciation – Sinking Fund

(2,353.782)

Nonearnings Cash Flow Less Sinking Fund

945.397

Depreciation

– Nonrecurring Items Effect on Earnings After Tax –

213.600

Used

Income After Taxes

8,329.000

Income Less Nonrecurring Items After Tax

8,542.600

Gross Cash Flow Less SF Deprec. – Operating Current 9,487.997

9,487.997

Dollar

Depreciation – Sinking Fund

2,353.782

Gross Cash Flow

11,841.779

Cash Economic Return (CER)

18.802

19.846

Difference: Ratio CER – IRR CER

(1.044)

TABLE 27.12

Sustainable Growth Rate

HPQ—Hewlett Packard Company

Variable Name

2008

Past Growth Rate for Plant Inflation Adjustment Revised 51.416

Asset Life – Weighted Average – Used in Valuation 5.471

Retirements – Replacements to Depreciating Assets Factor g/((1 + g) 0.059

ˆ life – 1)

Depreciating Assets Used in Valuation

15,576.338

Depreciating Retirements – Replacements

923.250

Gross Cash Flow Less SF Deprec. – Used in Valuation 9,487.997

– Cash Dividends Paid on Common and Preferred

(796.000)

– Depreciating Retirements – Replacements

(923.250)

Cash Available for Growth After Dividends

7,768.746

Gross Assets Used in Valuation

50,462.959

Sustainable Growth Rate After Dividends Used

15.395

ARRIVING AT THE DISCOUNT RATE FOR A THIRD TIME

Now we come to the important discount rate.17 The question is how

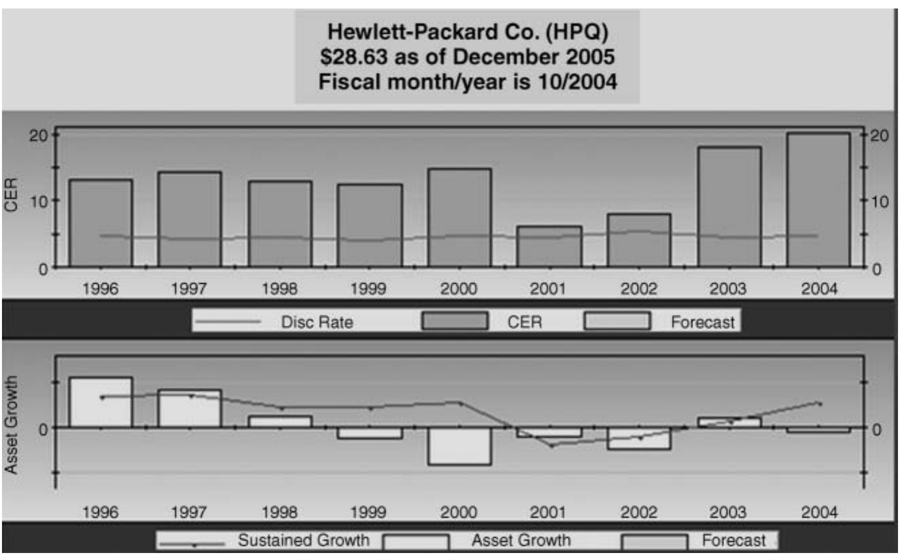
best to arrive at a discount rate. We place all of the company's risk into market-expected certainty-equivalent cash flows. Surely, that's a mouthful, but it's simple. It is the amount of cash the market expects the company to generate.

Traditional DCF and capitalization models use a build-up method based on CAPM, plus key factors unique to the company itself. These may include interest rates, inflation, commodity and other industry prices, and more.

On a road less traveled, our advanced LCRT model employs a *single* real cost of capital for discounting each year. That single discount rate produced the $28.93 intrinsic value per share in Table 27.5.

We are ready to apply all these formulas to a real company example, in this case, Hewlett-Packard. As we have stated, the key value drivers for our LCRT model are cash economic return and gross asset growth rates. Our HP

17For a more in-depth discussion of LCRT's real discount rate compared to traditional ones, please see Rawley Thomas and Robert J. Atra, "The LifeCycle Returns Valuation System," *The Valuation Handbook: Valuation Techniques from Today's Top Practitioners* (Wiley, 2010), pp. 300–302, "Appendix: Market-Derived Discount Rates and CAPM Beta Costs of Capital."



Another Tour through Our LCRT Model

FIGURE 27.9

Hewlett-Packard Intrinsic Valuation Model Drivers: Cash Economic Return and Real Asset Growth

Source: This material is reproduced with the permission of John Wiley & Sons, Inc.

chart in Figure 27.9 applies the knowledge gained from these drivers. The top panel compares the cash economic return with investors' real discount rate, or cost of capital. Let's stop for a quick explanation: The discount rate and cost of capital are one and the same. The bottom panel compares the annual gross asset growth rates with the company's real sustainable growth rate.

SUMMING UP

We can sum up our fade capitalization model this way:

- Fade intrinsic value to equal the present value of real net free cash flows produced from fading sustainable asset growth rates.

- Apply fading cash economic returns to those asset levels for 50 years.

- Wind down the remaining assets after that.

Our proposition is that the definitive LCRT model is the best methodology to use as the basis to decide whether to buy, hold, or sell the shares of specific companies or walk away from the firms at this time.

Many investors recognize the power of computer modeling to translate accounting data into measures of internal rates of return and intrinsic value

in a quantitative fashion. Computer models can do this without inputs from analysts or by putting values to such vital drivers as strategies, quality of management, technology prowess, market position, and other tangibles and intangibles.

Our research platform in our model goes well beyond these standard and popular modeling methods. We add many procedures and

methodologies that differ substantially from those conventional valuation methods.

As a result, we offer a way to test the reasonableness of the intrinsic values that are determined. We believe that the extent and depth of numerous empirical tests establish the reliability of the LCRT model in arriving at accurate intrinsic value numbers for the 7,000 companies in our universe.

What we are doing here is dissecting the LCRT model to show how it works. We describe how it is different. We demonstrate how it better analyzes companies to calculate their intrinsic value to determine whether the stock market currently is over-or undervaluing their equity.

We summarize and highlight the chief differences in the LCRT model when compared against conventional ways of conducting a discounted cash flow analysis.

In addition to serving as a reasonableness check, the LCRT valuation technology raises important questions about existing, commonly accepted methods. We believe our methodology answers these questions in the affirmative.

We are comparing our model with those commonly accepted models.

1. Should they display a confidence measure? Ours certainly offers considerable confidence, empirically validated.

2. Should models explicitly consider inflation in both historical analysis and future projections? We do.

3. Do existing models assume a declining rate of output from fixed assets as they are depreciated, and, if so, is the assumption correct? Again, our model assumes constant output until failure. And we have empirical testing data to show the accuracy of our assumptions.

4. Should DCF assumptions be explicitly tested for sensitivity, and what should be done with these findings? The answer clearly is yes. The findings are important in determining the ability of the model to estimate intrinsic value.

5. Can automated analysis of historical performance provide the means to ascertain more reliably future projections compared with management and analyst projections? Yes, our automated DCF model does a good job. But being able to overlay management and analyst

projections, built from their special knowledge, can improve predictability. The primary roles of analysts are to assure that historical data reflect the economics of the business and to measure the inflection points in their forecasts.

These are highly useful inputs from analysts. Frankly, we don't want their terminal values: They probably just add noise to the data, unless they are empirically validated.

6. Can a company with an unusual capital structure or abnormal near-term growth be valued using a single-period capitalization model, which incorporates a formula for fade to obtain normalized structure and growth over time? Ours does.

7. Are companies better selected for investment by using economic measures alone instead of screening by industry? We say they are, using our model. By enabling you to understand how to do that and by enabling you to put our methodology into practice in managing your portfolio, we establish the purpose of this book.

KEY TAKEAWAYS

1. Regression toward the mean or fade of company cash economic returns and growth enables us to transform a multiperiod model into a single-period model.

2. Consequently, single-period models produce intrinsic valuation calculations for each year based purely on historical data.

3. Value charts juxtapose fiscal year high/low prices against the intrinsic valuation of multiple models to enable you to visualize the results for each firm.

4. Tracking errors quantify the accuracy of each model. More accurate models tend to be more predictive, and thus are more useful for your decisions to buy, hold, sell, or short stocks.

5. The inflation-adjusted cash economic return reflects the average real internal rate of return of all the projects in place, with less bias than traditional accounting return measures. As a result, this economic measure compares directly with the cost of capital or investor return requirements to determine if the company's projects are creating or destroying value.

6. The sustainable growth rate reflects the cash available for reinvestment after dividends and provides a good estimate of the likely future growth in assets.

CHAPTER 28

Incorporating Risk

into Our Model

Successful equity investors work hard to understand and account for the risks inherent in their decisions to buy, hold, and sell certain stocks and manage their portfolios.

Risk and return work together. All stocks carry risk. Indeed, there is more risk involved in stock investing than most other instruments. Pick a safe certificate of deposit from a bank, guaranteed by the federal government, and your return likely will be less than it will from a stock, at least when the market is going good and over the long haul. Think of the return from the stock as your reward for taking the risk. With stocks, there are higher levels of uncertainty.

Risk is half of the equation in the risk/return ratio that has guided investors in making stock buy/hold/sell decisions. Smart investors and students of investing always have preached that assessment of risk should be just as necessary and is as valuable as decisions on which stocks to hold in your portfolio. Sometimes, it seems that investors throw risk considerations aside in their zeal to optimize returns farthest and fastest.

Risk is a huge factor in return outcomes. Really effective risk analysis should lead to a higher return. At those times when the market is charging full speed ahead, risk seems less useful; high returns will result anyway.

But studies show that better risk analysis would have produced results even higher than those achieved.

And risk during the tough times in the market can be the basis to preserve capital and even eke out a modest profit—especially when the market becomes most volatile. Good risk analysis can save an investor from making mistakes caused by such human tendencies as the following:

- Being overly optimistic.

- Failing to see a weakness in a company that is coming soon.
- Misreading a looming macro factor.
- Following the crowd.
- Purchasing your neighbor's stock picks.

Conclusion: Market conditions continually cause investors to place less emphasis on the risk half of the equation than they should, for whatever reason.

Plus, maybe during tough times, investors overweight risk, running scared and missing opportunity. We can't rule out that reality, either.

Because of these realities, we focus hard on the importance of risk in our model. We want you to make sure your model isn't neglecting risk.

We contend that the risk of investing in the equity of a company is closely tied to where the business is in its life cycle. Companies do not stand still. At any time, most are gaining or losing—competitive and market position, revenues, profits, cash flows. Thus, risk is closely allied with what we call fade. A company's performance typically fades, primarily because competition has moved in, replicating, improving, or replacing the products or services that brought the company success. In reality, the company is moving through its life cycle.

INCORPORATING RISK AND FADE INTO OUR LCRT MODEL

Risk analysis and quantification function as critical components of our LCRT models. We have studied risk from all aspects for decades. We made significant strides in being able to better understand the extent to which risk impacts value and how to best measure the risk involved when considering an investment.

Our focus has been on the dispersion of high/low stock prices to measure one dimension of risk. We seek to correlate this dispersion

risk across the spectrum of value drivers—from macro through sector and industry and the company being evaluated.

Those of you with technical backgrounds know the terms centering on risk quite well. We define terms and words as we go along because we want to make sure every reader takes command of the risk aspects of selecting stocks and managing your portfolios. It's that important.

Work to measure risk by academics and investment professionals is progressing, but risk still remains something of a mystery. Efforts to model risk are picking up, but they are not developed yet to the point of yielding widespread confidence that we know how to define and measure risk accurately in making a stock decision.

For us, efforts center on overlaying risk factors to our models that essentially estimate intrinsic value to determine if a given stock currently is being under-, fairly, or overpriced by the market.

Thus, discounted cash flow modeling, refined extensively by us in our LCRT model, serves as the anchor. Events, market behavior, notably over-and underreaction, and company-specific analyses are the added overlays as we build our models to measure risk.

We cite the situation of a stock being illiquid as an example of how people are trying to account for risk today. An investment manager rebalancing his or her portfolio encounters a negative surprise in a holding and decides to sell out the position over the next four weeks. Because the position is big, the market picks up the action, overacts, and drives down the price, well below the company's intrinsic value. The risk analysis here centers on gaining a better understanding of the event that is triggering the market action (the earnings surprise or sell-off) and to what extent the event contributes to the risk dispersion.

In this age of an obsessive focus on earnings, market overreactions occur often. Investors believe the company is in trouble; they're not looking at the fundamentals. They're being influenced by the noise. To be sure, noise has to be considered because it is affecting the price.

Risk models need to get beyond the noise. First is by measuring it, connecting the dots, to understand better the risk involved, the extent of it, and how it is going to affect market behavior and stock price. In our modeling, we seek to overlay risk with our estimate of intrinsic value, calculating its accuracy through our tracking error analysis. We

add our empirical evidence that the market moves stock prices toward intrinsic value and make our investing decisions accordingly. Plus our framework for measuring risk continues to evolve.

At the same time, we are encouraging others to do more work on analyzing and measuring risk as part of the stock price formation process.

In fact, we would like to see the formation of a coalition of people to bring together expertise in stock investing and risk analysis; we know they have their own sizable stake in improving return outcomes.

Our colleague Robert Atra, chair of the Department of Finance at Lewis University, has conducted considerable study on measuring risk against returns. We are working together to expand his efforts by comparing risk when using discounted cash flow versus multifactor modeling. Our goal is to pull them together. It makes sense. Factor models pick up more short-term risk factors in the price formation process, while DCF models are more about long-term intrinsic valuation.

For example, we have looked closely at a brokerage firm model that contains 18 factors, with one of them being the price to cash flow multiple.

We would argue that price to cash flow should be the core or anchor in a model that seeks to determine value and measure risk, not just one of

18 factors. Better yet, price to intrinsic value should form the core. The other 17 factors serve as overlays in a robust, complete price formation model. A price formation model is not a factor model. Forming an accurate fair price is the fundamental purpose of the model, with our LCRT model serving as a prime example.

We are not applying multiple regression analysis in our model. We are trying to model the price formation process. All this is nonlinear.

Momentum (multifactor) models essentially are forecasting that the price will continue to go in the same direction; that’s all you can do with a linear model.

In contrast, when using a price formation process model, you know that the price is going to hit the barrier of the range of bounded rationality and change direction. We discuss range of bounded rationality briefly around Figure 16.5. That's a vital part of the risk analysis process. The key is to identify and understand the inflection points, know when they are occurring, and have a good model to gauge the price impact. Our model does that by matching intrinsic value estimates against current stock price. Astute investors make a lot of money in this fashion.

HOW RISK MODELING FOR STOCK SELECTION HAS EVOLVED

First, we review some basics on how the academics and professional investors incorporate risk into their models.

The fundamentals of risk analysis have been thought through and refined by scholars and investors over time. A prime foundation fundamental establishes the thinking that the returns and prices of stocks follow a normal pattern, or what scholars call a normal distribution. It is popularly called a Gaussian distribution or log normal.

Figure 28.1 shows the distribution of the natural log (LN) wealth index of total shareholder return relative to the S&P 500 with two distribution overlays. The left chart shows the Gaussian normal distribution, while the right chart shows the stable Paretian distribution. "Even a caveman" can see that the right chart more accurately models the fat tails in the distribution much better than the left chart.

Here are the technical details. To examine the normality of stock returns on the industrial universe, LifeCycle's initial automated research computed annual returns on 5,500 industrial firms from 1994 to 2003. The natural log of 1 plus the total shareholder return transforms the distribution of logged returns. Over this transformed return data, we superimposed both a normal

3,000

3,000

Actual

Actual

Normal

Stable

2,500

2,500

2,000

2,000

1,500

1,500

1,000

1,000

Number of Company - Years

500

Number of Company - Years

500

0

0

−4

−4

−3.3

−2.6

−1.9

−1.2

−0.5

−0.2

−0.9

−1.6

−3.3

−2.6

−1.9

−1.2

−0.5

−0.2

−0.9

−1.6

LN of Wealth Index from Total

LN of Wealth Index from Total

Shareholder Return Relative to S&P 500

Shareholder Return Relative to S&P 500

FIGURE 28.1

Distribution of Stock Returns

Source: This material is reproduced with the permission of John Wiley & Sons, Inc.

and a stable distribution. The histogram data and distributions appear in Figure 28.1.

As demonstrated in the left chart, the normal distribution cannot account for the high peak or the thicker tails of the shareholder returns.

In sharp contrast, the stable distribution demonstrates a close fit, due to its peakedness and thicker tails. The figure also clearly illustrates where the mass that creates the peak and fatter tails arises. The normal distribution reveals a significant gap between the hypothetical

distribution and the empirical distribution in the shoulder area, perhaps most significant around one standard deviation. For more technical discussions of these results, please see Chapter 29, "Producing Lower Fat-Tailed Risk with Higher Return."

Studies have shown that the distribution of risk has tails that can be thin or thick, the latter also often referred to as fat tails. These tails become times when the values of stock returns and prices are at their highest or lowest levels, labeled by scholars as extremes when compared against normal distributions. They are times when normal or Gaussian distributions are not at work in predicting how the market will perform. We all know how difficult it has been to predict the market even from day to day during the economic problems of 2008, 2009, and continuing.

These can be times when market prices and returns change or move at their most dramatic levels—up or down. At their most extreme, we have come to call these periods bubbles or crashes,[1] or at least major downturns or upswings.

Typically, fat tails serve us better in explaining these big swings that cause prices and returns to fluctuate substantially more than basic changes in economic fundamentals. This conclusion was reached by academic and author Robert Shiller back in the 1960s.[2]

As Svetlozar Todorov Rachev, Frank J. Fabozzi, and Christian Menn[3]

write, mathematical models of market behavior support a most important premise caused by fat tails. That premise is that fat-tailed price/return distributions occur as a result of the combined actions of the following:

- Rational investors making decisions based on good analysis of the fundamentals.

- Noise investors trying to capture a short-term benefit from current frenetic market activity.

This most important premise makes us relax the traditional academic assumption that investors are homogeneous.[4] They definitely are not. Each investor group focuses on a different type of information to make its decisions.

It was Benoit Mandelbrot who challenged the by-then accepted thinking that stock prices and returns follow normal distribution patterns. In concluding that prices and returns do not follow normal distributions, he said they were stable Paretian distributions. Eugene Fama5 soon afterward 1For an excellent empirical confirmation of bubbles and crashes within an economic laboratory, please see Vernon Smith, "Experimental Methods in the Political Economy of Exchange," *Science*, Vol. 235, October 10, 1986, pp. 167–173; and

"Vernon Smith," *Wall Street Journal*, November 17, 1987.

2Robert Shiller, "Do Stock Prices Move Too Much to Be Justified by Subsequent Changes in Dividends," *American Economic Review*, January 1981, pp. 421–436.

3Svetlozar Rachev, Christian Menn, and Frank Fabozzi, *Fat-Tailed and Skewed Return Distributions: Implications for Risk Management, Portfolio Selection, and Option Pricing* (Wiley, 2005), p. 2, footnote 2.

4Taken from a list of academic assumptions often made, as a part of the Financial Management Association's Practitioner Demand Driven Academic Research Initiative (PDDARI). Please see "Appendix A—FMA PDDARI," in Wiley's *Valuation Handbook*, pp. 596–598 and "Appendix B—Examples of Assumptions and Theories Deserving Debate and Empirical Quantification," pp. 598–601. Item 4(a) on page 600 lists "homogeneous investor expectations for risk and return."

5Fama, Eugene F., "Portfolio Analysis in a Stable Paretian Market," *Management Science*, January 1965, pp. 404–419.

(*Continued*)

added his support to the thinking that market prices and returns follow stable Paretian distributions.

Obviously, academic debate raged on which theory is most accurate, and, indeed, on whether either supposition is accurate. Add the fact that fat-tailed stable Paretian distributions contain infinite variance and the voices grow louder in order to save academic beliefs in traditional Gaussian statistics.

Empirical data was an inconvenience for researchers who wished to remain with statistical packages that do not cover stable Paretian parameter estimation procedures. Despite my several suggestions,

SPSS has chosen not to incorporate stable Paretian parameter estimation procedures into its statistical package. Academics prefer closed-form solutions, not difficult-to-analyze distributions with no closed-form parameters. It's a classic chicken and egg problem. Without easy to employ, readily available statistical procedures, academics become much more reluctant to devote their scarce time to difficult statistical research.

Financial scholars concur that returns vary less with portfolios that are substantially diversified. It certainly made sense to Harry Markowitz, who was an early proponent of building a well-diversified portfolio. He is the father of the mean-variance concept. The risk is measured by the variance; returns and prices of each stock in a portfolio will not be the same; and the price and return of each stock changes over time. The benefits of diversification are realized through computations that show the risk to be less for the entire portfolio than it is for each individual stock.

Eugene Fama added that it is vital to study the impact of the fat tails in a diversified portfolio—especially one that follows a stable Paretian (*Note Continued*)

Fama, Eugene F., "Mandelbrot and the Stable Paretian Hypothesis," *The Random Character of Stock Market Prices*, Paul Cootner, Ed. (MIT Press, 1964), pp. 297–306.

Fama, Eugene F., "Parameter Estimates for Symmetric Stable Distributions,"

Journal of American Statistical Association, June 1971, Vol. 64, No. 334, pp. 331–338.

Apparently, after this early research work, Fama changed his mind and focused on the efficient markets hypothesis (EMH). EMH assumes independent random draws from the distribution and, consequently, is inconsistent with Mandelbrot's stable Paretian research. Stable Paretian distributions generally require dependent draws from the distribution, so memory exists in the price formation process. Also, the central limit theorem assumes the existence of variance. An alpha peakedness parameter of a stable distribution significantly less than 2.00 implies infinite variance. Therefore, the statistics underlying the capital asset pricing model (CAPM)—standard deviation, beta, and mean-variance portfolio construction—do not exist. This means that the statistical foundation underlying modern portfolio theory does not exist.

distribution of returns. He developed a tail index to measure the effect of diversifying your portfolios when adding positions. The goal in adding stocks to diversify your portfolio further is to reduce the risk by spreading it more to reduce the dispersion of returns as positions are added. Remember, those tails present extreme values.

As Rachev, Fabozzi, and Menn state in their book:6 "Fama derived the boundaries of the parameter so that an increase in the number provides the benefits of diversification." Fama also noted that allowing the alpha peakedness stable Paretian parameter to become less than 1.00 (see discussion in Chapter 29, "Producing Lower Fat-Tailed Risk with Higher Returns") can cause an increase in holdings to actually produce greater dispersion of stock returns, not less. Adding to the number of securities in the portfolio with extremely fat tails actually adds to the risk.7

All these empirical results suggest that we need a new theory of portfolio construction that does not rely on mean-variance. The new theory needs to incorporate these empirical realities of extreme events that occur all too frequently for a Gaussian normal distribution.

MANAGING RISK IN OUR LCRT MODELING

As we have made perfectly clear by now, risk and fade are principal elements of our working model. Fade recognizes the reality of a company's performance changing, namely, fading down as competition moves in and/or the appetite for its products and services wanes, or fading up as new initiatives and successes take hold. Studies show that companies are more likely to fade down, regressing to the mean over time as competition grows or their market changes.

Our way to measure risk represents a road less traveled. We go beyond the common practices of standard deviation, tracking error, and the beta formula found in the capital asset pricing model (CAPM), favoring to measure risk instead by the distribution of tails.

How do we incorporate the ability to identify and measure risk in our LCRT model? We start with basic role of the model to calculate intrinsic values, which represent the true economic value of the security. At any time, that estimation forms a range of the value; it cannot be a precise number, but a reasonable estimate of the underlying value.

6Svetlozar Rachev, Christian Menn, and Frank Fabozzi, *Fat-Tailed and Skewed Return Distributions: Implications for Risk Management, Portfolio Selection, and Option Pricing* (Wiley, 2005), p. 3.

7LCRT's research suggests that this situation only occurs with two kinds of portfolios: firms with extreme financial leverage and small startup firms with negative cash economic returns.

Let's call it a range of bounded rationality, reached by examining the dispersion of actual prices over a certain time period and then adjusting this dispersion to the intrinsic value. (Figure 16.5 displays a graphical example and offers more explanation.) As an example, we see a company with its intrinsic value shown by the model to be worth $40 a share, carrying a range of bounded rationality between $34 and $44 a share. The current market price is $26; it is being undervalued.

We developed this range of bounded rationality by applying two schools of thought. The first is tied to observing behavioral finance. It proves that the market isn't efficient by showing that dispersions around reasonable estimates of intrinsic value are far too wide. The notion of instantaneous strong-form market efficiency just isn't real. In most cases the market overreacts. Price often does not equal intrinsic value.

Thus, you can build an advantage by having better data concerning risk and by having better risk measurement tools. Investors with better information can achieve both lower risk and higher return performance.

Robert Shiller (please see index for references) has long been a leading voice in showing that the extensive price dispersions surrounding intrinsic value prove that the market is not efficient. In an efficient market, these wide dispersions wouldn't exist. As a result, those always-there herd instincts of investors cause the market to overreact, resulting in prices ranging far from intrinsic values.

LOOKING AT TECHNICAL ANALYSIS AND RANGES OF

BOUNDED RATIONALITY AGAIN

We have previously discussed how ranges of bounded rationality (Rawley ranges) try to measure market sentiment. Part of market sentiment assesses when the markets have overreacted by bidding up

stock prices too high relative to intrinsic valuations. At that time, we turned to the popular Bollinger bands, which are familiar to many investors studying risk. Since we covered this topic extensively around Figure 16.5, we won't repeat that discussion here.

There is more, however, especially for our technocrats. Our model applies a mathematical dispersion measure to develop potential future price ranges. These relationships are determined by using individual company fundamentals8 as independent variables in a regression against the historical stock price dispersions. Multiplying the measure of dispersion by the intrinsic 8The company fundamentals include constant-dollar gross investment as the size variable, cash economic return as the profitability variable, and trading volume as the liquidity variable.

value produces the high-end estimate of value, while dividing the intrinsic value by the dispersion measures the low-end estimate of value. This is how we determine the ranges of bounded rationality.

We have found that the low-end valuation predicts inflection points better than the high-end readings. This tells us that stocks drifting away from their intrinsic values are likely to bounce off the low end and migrate back toward intrinsic value. These undervalued stocks offer good investment opportunity. Prices also bounce off the high end as they become overvalued.

You want to sell when that price is at its highest point.

While counterintuitive, the low end becomes more predictive of future returns from overvalued stocks than the high end. We hypothesize that the low end better reflects investors' aversion to loss. However, this empirical result deserves more conceptual thought and possibly more research for further verification. Behavioral finance research on human emotions may help.

Rawley ranges, described around Figure 16.5, look at data historically to help us determine when a stock is substantially overvalued and we should consider selling it and when a stock is substantially undervalued and we should consider buying it, or buying more of it. In the case of the latter stock, we can be confident of a good return. Going back to one of our charts, Hewlett-Packard was shown at the time to have an intrinsic value of $46 a share. It was a rich stock

when being priced by the market at $80 a share, but it was cheap when the price was $42. We can look at those prices as the range.

MEASURING THE EXTENT OF OVER—

AND UNDERVALUATION

A better method is to pick up the inflection point. The Bollinger bands and other ways are not based on changes in intrinsic value tied to fundamentals.

Similarly, multifactor models based on momentum are likely to miss the inflection points. Factor models fail. They are based on price momentum and often miss the inflection points. They work by conducting multiple regressions of returns against each factor. The closest we might come with a factor model is to use the price to cash flow factor, but in a multifactor model, it just functions as one element, a poor proxy for distance from DCF

intrinsic value.

We model the effects more directly tied to intrinsic value, built from the economics of cash returns and cash reinvested. Our model provides a view by calculating the intrinsic value. A key benefit of Rawley ranges is to pick up on the inflection points. You can work with our Rawley ranges

when using our model and our ValuFocus. There is a tab for Risk on our ValuFocus dashboard.

In translating the technical description of our risk modeling, Rawley ranges help answer the questions of when overvalued is really overvalued and you need to be concerned, and when undervalued is justified and you want to consider the investment seriously. We know that a price can stay high and a stock can be overvalued for a long time, and that a stock can stay undervalued for a long time.

So the basic question becomes: When is a stock significantly over-or undervalued and likely to go in the opposite direction? The financial implications are important. You have a stock in your portfolio that is shown to be overvalued, you have a low cost basis, tax ramifications when selling it, plus when selling it, you must replace that stock with one that will provide a sufficiently superior return to cover those taxes. The long-term capital gain is 15 percent. Seems as if you need a

30 percent return to gain a 15 percent return, plus handle the 15 percent tax bite. Thus, you need to pick a stock that doubles the return.

This is all part of portfolio management, isn't it? You may take a loss on a stock that is sizably overvalued, and you likely have a number of stocks that happily are undervalued, leading to high returns when they are sold.

Our model, with its under-and overvaluation percentages and our bounded ranges of rationality, helps us analyze our portfolio positions to identify the best actions to take.

MODELING THE DISPERSION OF STOCK PRICE

To review: Rawley ranges, illustrated around Figure 16.5, are determined empirically, using our complex, proprietary, nonlinear function of cash economic return, investment size, and trading volume. Chapter 14, "Our Automated DCF Model—The Better Model," details this process of the model. The ranges work well. When a company gets larger and then starts to mature, the ranges contract automatically. It is a highly sophisticated function.

I developed the ranges after spending considerable time studying the thinking of such behavioral finance standouts as Robert Shiller. I recognized the similarity with Bollinger bands, especially with the inclusion of the plus-minus 1 1 / 2 standard deviation. Technically, Shiller and the others are working to figure out where the price is likely to break off the range and come back. But here I go in my favorite other direction, believing it is better to model the risk based on economic fundamentals instead of on prices.

Then, I took the geometric mean of the high-low range, deflated by the S&P 500 index relative to overperformance every fiscal year, and decided

to correlate it with cash economic return, size, and trading volume—

considering these three measures to be the best economic drivers.

What results is a way to model the dispersion of the stock price on a company-by-company basis. We use intrinsic value as the anchor

while also comparing it with the dispersion caused by market overreaction.

By extensive backtesting, I discovered that working off the lower bound of rationality was better on both ends of the tails—the lower and higher ones. Behavioral finance specialists wanting to avoid losses favor the midday high band. But we have found the low band works best. In effect, we are sorting across all bands.

APPLYING RISK IN OUR MODEL

Now let's apply all this advanced theory and modeling in the real world of investing to make practical decisions about which stocks to buy, hold, and sell when managing your portfolio.

Risk and uncertainty do not represent the same thing. Risk focuses on the sentiment dispersion of views of the future by the market. Research efforts focus on modeling the risk function to understand the dispersion better—to identify it, quantify it, measure its extent, time it, and figure out how best to reduce or minimize it. By definition, we cannot know the distribution of uncertain events; they are uncertain.

In its simplest form, our LCRT model is identifying risk by saying if you buy an undervalued stock, you know its direction will likely be up.

The key element of risk involved here is the direction of the stock price, not necessarily the movement or the pace of that movement. A severely undervalued stock is much more certain to rise in price. In this case, the investor is getting price appreciation with little or no risk.

We are conducting close study and analysis of the extent to which stocks are over-and undervalued. Highly useful in this analysis is to rank stocks from most to least undervalued and from most to least overvalued.

Accordingly, we are ranking stocks in our universe quarterly, identifying the bottom 1 percent and the top 95–99 percent on both under-and overvaluation scales.

This is an important step in picking stocks for your portfolio. You want to be well diversified. To help accomplish healthy diversification, we are ranking stocks in the under-to overvaluation spectrum in numerous breakouts, showing how many are in each group and naming them. These cover templates, sectors, industries.

You can readily see which stocks are good buys and which stocks are torpedoes to be avoided.

We also are breaking out our universe on the basis of economic drivers, in our case, by the companies' cash economic returns. The identifications

span a wide spectrum, covering startups, growth and value companies, large and medium and small caps, extent of leverage, and still more categories.

This information is available when working our model and by using our ValuFocus product offering.

We cite a recent study to help apply risk in managing your portfolio.

At any time, you can view the stock market and, indeed, your portfolio as having three buckets—stocks that are buys, sells, and holds. Studies suggest that the investment universe typically consists of 20 percent buys, 20 percent sells, and 60 percent holds. You want to find the stocks that are buys because the market presently is undervaluing them as reflected in their price, and then add them to your portfolio. You want to identify any stocks in or not in your portfolio that are sells. If they are in your portfolio, your best bet is to sell them. If they are not in your portfolio, you may want to seriously consider shorting one or several of them.

Interestingly, these buy and sell stocks (under-and overvalued companies) are less risky. Your decisions to buy, sell, or short these stocks are likely to generate good returns. More risky are those stocks in the middle, namely, the 60 percent that are nearer to fair valuation. These stocks may stay the same or go up and down as the future economics of their operations changes, but often you are not compensated for this risk. These are the stocks in the hold bucket of the market and your portfolio. These stocks often don't promise any superior return and often present some uncompensated risks.

Studies bear out this premise, as shown by applying standard measures of risk. From a stable Paretian return standpoint, fairly valued stocks in the middle offer the highest risk and lowest return, determined by a higher risk alpha peakedness level of 11 / 2.9 In contrast, the 20 percent buy/20 percent sell short stocks approach offers the lower risk Gaussian normal distribution with an alpha peakedness of 2.00 and no fat tails. This is true whether you are

buying, selling, or shorting the stocks.

Thus, you reduce risk by shorting the sells. If you short the sells, you essentially are creating a 130/30 portfolio. It consists of 130 percent buys and 30 percent shorts, a step that serves to collateralize the buys. You are positioned to make the spread between the buys and sells, whether the market rises or falls. Therefore, you are less exposed to market behavior.

You want to watch for best times to rebalance the portfolio. I'm not talking about every day here. Maybe look at the possibility every three or four weeks or so. Is new information impacting one or more of your

9Please see Chapter 29 for further technical explanation of both the statistics of a stable Paretian distribution and the empirical results of producing lower risk with higher return.

stocks? Is a new inflection point emerging? Or more than one? Other LCRT

research suggests that a buying opportunity on day five may be taking place.

Take a close look at that universe of fairly valued stocks. Identify companies from the universe most likely to strengthen and grow and become undervalued before the market catches up. Identify the companies most likely to become overvalued; perhaps candidates to be shorted, but certainly not bought. Read the research. Study the fundamentals. Review the macro and industry drivers affecting the company.

You are functioning as an active investor, not a trader, looking for values that you intend to keep in your portfolio as long as the fundamentals satisfy. Prices and intrinsic values don't change that much on a daily basis.

You are very much still using the model as your foundation, comparing market price with intrinsic value. The intrinsic values are the anchor.

At times, with certain companies, your research and analysis may be seeking an answer to an important, basic question. You may not be sure if the price reflects intrinsic value, or if the market is overreacting

to a short-term change. By trusting the intrinsic value calculation, you can be a contrarian, confident that, indeed, the market is overreacting.

We are describing what it means to be a cash-loving contrarian.

KEY TAKEAWAYS

1. Rawley ranges of bounded rationality (like Bollinger bands) measure the likelihood that prices will reach an inflection point and reverse course. As a result, these ranges help you make much better investment decisions.

2. These ranges of bounded rationality measure the dispersion of high/low prices around the intrinsic valuations as the anchors.

3. Dispersion models of ranges of bounded rationality rely on complex, nonlinear functions of cash economic return, size, and trading volume.

4. Concentration ratios may be much better than traditional academic mean-variance for measuring portfolio diversification. Most great meltdowns occurred in portfolios with too great a set of concentrations in particular stocks, industries, or sectors. The great meltdown in 2007–2009 concentrated in the home mortgage sector with no verification of borrower's income—induced by government policy to encourage home ownership.

CHAPTER 29

Producing Lower Fat-Tailed Risk

with Higher Returns

For the statistically inclined, this chapter continues the discussion from Chapter 28, "How Risk Modeling for Stock Selection Has Evolved"

and excerpts two key sections from Chapter 9, "Lower Risk and Higher Returns: Linking Stable Paretian Distributions and Discounted Cash Flow,"

from Wiley's *Valuation Handbook*.1

Based on the data, LifeCycle's system computed the statistics in Table 29.1 for the four stable Paretian parameters. All four parameters confirm the non-normality of the data. The peakedness of the data is

obvious from the alpha parameter. The data also are negatively skewed and more dispersed than the normal distribution would imply. Statistically, each and every parameter is significantly different from the normal distribution parameters. These statistical results effectively refute Paul Cootner's[2]

constructive criticism of Mandelbrot's research as "too casual."

As described by J. Huston McCulloch, the following parameters characterize a stable Paretian distribution:

- α, which determines the peakedness and thickness of the tails, falls in the range $0 \leq \alpha \leq 2$, where 2 is the limiting case of the normal distribution.

- β determines the skewness.

- "c" determines the scale (dispersion).

- δ determines the location.

For the limiting normal case, α is 2 and β is zero. The σ and μ parameters then become the standard deviation and mean of the distribution. As a stable [1]Rawley Thomas, Dandan Yang, and Robert J. Atra, "Lower Risk and Higher Returns: Linking Stable Paretian Distributions and Discounted Cash Flow," *The Valuation Handbook: Valuation Techniques from Today's Top Practitioners* (Wiley, 2010), pp. 566–567 and 571–573.

[2]Paul Cootner, ed. *The Random Character of Stock Prices* (MIT Press), 1964, p. 333.

TABLE 29.1

Stable Paretian Parameters of Stock Returns

Results

Value

Standard Error t-Statistic

α (peakedness)

1.48

0.01

43.41

Difference from 2.00

β (skewness)

-0.31

0.02

-17.55

Difference from 0.00

"c" (dispersion)

0.39

0.01

50.60

Difference from 0.00

δ (location or average) -0.16

0.02

-7.32

Difference from 0.00

Sources: 5,500 industrial firms, 1994–2003, total shareholder return (TSR) from FY $+3$ to $+15$ months relative to S&P 500, Hemscott Data, LCRT platform calculations; J. Huston McCulloch, "Simple Consistent Estimators of Stable Distribution Parameters," *Communications in Statistics—Simulation and Computation* 15, no. 4

(1986): 1109–1136.

distribution departs from normality, the lower α implies relatively fatter tails and a more peaked distribution.

Stable distributions pose one extremely serious problem: For an α less than 2, any moment of order greater than α is not defined, thus rendering theories relying on variance not useful.3 Therefore, testing whether a set of securities possesses an α peakedness parameter significantly less than 2

produces useful information about the possibility of extreme returns and the benefits of diversification corresponding to that set.

The analysis confirms that the normality assumption likely is a flawed one for portfolio management. The analysis is not, however, normative.

It only describes the distribution for the benefit of security analysts and portfolio managers. It does not describe how they may apply these insights.

LifeCycle's research recommends avenues in which both analysts and portfolio managers may avoid fat-tailed returns by more effective security selection.

ALTERNATIVES TO STABLE PARETIAN DISTRIBUTIONS

To model these fat tails, many people have proposed distributions other than the stable Paretian. These distributions include Student-t, inverse normal, and overlays of multiple Gaussian normal distributions. Other distributions possess the advantage that one can model them easily with a closed form, 3The LifeCycle system does not rely on any mean-variance calculations in determining its intrinsic valuations. Consequently, the system remains consistent with the non-Gaussian methodology of this chapter.

algebraic formula. These other distributions possess higher moments to enable applying the central limit theorem and other foundations of statistics.

Most of these distributions are included in standard statistical packages, such as SPSS. In contrast, the stable Paretian is not included in the standard statistical packages. For this reason, it requires John Nolan's software or Huston McCulloch's approximation procedures, which are not commonly available. Add the inconvenient property that variance and all other upper moments are infinite; they do not exist. Consequently, traditional Gaussian statistics do not apply.

Fundamentally, we chose the stable Paretian distribution, long researched by Benoit Mandelbrot, for a number of good reasons.

1. It more closely models actual data, especially in those cases of small startup firms and overly leveraged firms when the mean itself actually becomes infinite. We challenge those people preferring alternative distributions to empirically test their preference against these data sets.

2. It is scalable, which means it applies to minutes, days, months, years, and so on.

3. It relaxes the assumption of independence in the draws from the distribution. This means that the economic system has memory; where you start matters a great deal. To us, this memory assumption reflects common sense.

4. It models the data with only four parameters.

5. It does not require "jump" processes to model the data. Jump processes assume that the underlying distribution jumps from one distribution to another with a different mean.

Figure 29.1 display two extreme distributions from LCRT's extended research. Table 29.2 demonstrates that both of these distributions possess alpha peakedness significantly less than or near 1.00. These peakedness results mean that the tails are so fat that the mean or average does not exist. We doubt that any other distribution would fit these extreme cases of small startups or overleveraged firms. However, we can supply the data to any academic who wishes to test his or her favorite distribution against this information.

Figure 29.2 displays the under- (over-) valuation for heavily-leveraged industrial firms with percent debt to debt capacity above 75 percent. (Please see "Dealing with Debt Leverage" in Chapter 16 for an explanation of debt capacity.) In Table 29.3 please note the 1.07 alpha peakedness is only 1.91

standard errors away from 1.00, which is the point where the mean becomes nonexistent. Choosing more leveraged firms most likely would produce an alpha peakedness significantly less than 1.00.

9000

9000

Actual

Actual

8000

Normal

8000

Stable

7000

7000

6000

6000

5000

5000

4000

4000

3000

3000

2000

2000

Number of Company - Years

Number of Company - Years

1000

1000

0

0

−0

−0

−100

−75

75

−50

50

−25

25

100

−100

−75

75

−50

50

−25

25

100

Cash Economic Return

Cash Economic Return

FIGURE 29.1

Cash Economic Return, Including Small StartUps TABLE 29.2

Stable Paretian Parameters of Cash Economic Returns **Results**

Value Std. Error t-Statistic

alpha (“peakedness”)

0.92

0.01

8.08

Difference from 1.00

beta ("skewness")

−0.37

0.01

−25.81 Difference from 0.00

c ("dispersion")

4.02

0.02

258.78

Difference from 0.00

delta ("location" or "average") 18.58

#N/A

#N/A

Difference from 0.00

COMPARISON OF TRADITIONAL GAUSSIAN MEASURES

WITH STABLE PARETIAN

To surmount these limitations of annual data and limited number of observations, a second test creates a panel of data each year by ranking the securities based on their intrinsic values. The test then collects the data across all the years for every security to compute risk and return measures.

Each security, therefore, represents one data point of over/ undervaluation to compare with the associated annual return.

The question arises, once again, whether the returns correlate with risk as measured by a traditional metric, such as standard deviation. As with quarterly rebalancing, standard deviation compared with over-and

TABLE 29.3

Stable Paretian Statistical Analysis of Heavily Leveraged Firms
Results

	Value	**Std. Error**	**t-Statistic**	
alpha ("peakedness")	1.07	0.03	−1.91	Difference from 1.00
beta ("skewness")	0.82	0.04	20.59	Difference from 0.00
c ("dispersion")	71.91	0.04	1,827.43	Difference from 0.00
delta ("location" or "average")	538.21	#N/A	#N/A	Difference from 0.00

undervaluation follows an approximate U shape, with the highest standard deviations produced by the most over and undervalued securities. These results appear in Figure 29.3.

In contrast to standard deviation, Figure 29.4 displays risk, as measured by the alpha peakedness parameter, as an inverted U when measured across over-and undervaluations. The panel data confirm that managers may lessen exposure to extreme events by investing in securities that are extensively over-or undervalued; ironically, the very

same securities that possess a high standard deviation of returns. Thus, according to the annual 250

Actual

Stable

s

200

earY

y -

150

100

Number of Compan

50

0

100

200

300

400

500

LCRT Research Model % Under

(Over) Valuation

FIGURE 29.2

Under- (Over-) Valuation of

Heavily Leveraged Firms

65

60

55

50

45

Standard Deviation 40

35

1–5% 5–10%10–20%20–30%30–40%40–50%50–60%60–70%70–80%80–90%90–95%95–99%Top 1%

Bottom 1%

% Under-or Overvaluation

FIGURE 29.3

Standard Deviation of Returns of Overvalued and Undervalued Securities—Panel Data

Source: This material is reproduced with the permission of John Wiley & Sons, Inc.

data, investment managers may experience higher returns and lower risk (as measured by the normality of the returns) by either going long in undervalued securities or shorting the most overvalued securities.

Statistics for the panel data appear Table 29.4. The t-statistics reveal that securities that are neither extremely overvalued nor undervalued have alpha parameters significantly different from 2. As a result, the test cannot reject 1.0

1.1

1.2

1.3

1.4

1.5

1.6

1.7

1.8

1.9

2.0

Alpha Peakedness Parameter 2.1

1–5% 5–10%10–20%20–30%30–40%40–50%50–60%60–70%70–80%80–90%90–95%95–99%Top 1%

Bottom 1%

% Under-or Overvaluation

FIGURE 29.4

Alpha Peakedness Parameters of Overvalued and Undervalued Securities—Panel Data

Source: This material is reproduced with the permission of John Wiley & Sons, Inc.

are

Top

1%

Most

2.00

0.00

Undervalued

t-statistics

–59 99% 1.76 1.13 bold

–

95%

1.60

2.33

–0

Underlined

8

90%

1.57

3.98

–

70

80%

1.59

4.00

Returns.

–06 70% 1.55 4.60

–

LifeCycle

50

60%

1.52

4.86

from

–04 50% 1.72 2.18

Percentiles

calculations

–

30

40%

1.55

4.76

–

Data

02 30% 1.57

4.17

anel

Morningstar;

P

–

—

10

20%

1.54

4.54

from

–5 10% 1.78 1.17 data

Parameters

–1 5%

price

1.98

0.09

and

1%

Peakedness

2.00

0.00

Most

level.

Bottom

Overvalued

statement

5%

Alpha

the

at

29.4

Financial

peakedness

TABLE

Alpha

t-statistic

Source:

significant

317

normality for securities that have an intrinsic value different from market value. However, extensive stable Paretian distribution analysis confirms that fairly valued securities may become more risky than extremely over-or undervalued ones.

Quarterly returns on portfolios 2002–2006: 4 $<$ plant life $<$ 50; debt/

debt capacity $<$ 85 percent; price $>$ \$5; tracking error $<$ 45 percent; market capitalization weights $>$ 40th percentile.

KEY TAKEAWAYS

1. Distributions in the field of finance and investments tend to follow fat tails. These fat-tail distributions can best be described with the stable Paretian distribution, often with infinite variances and sometimes even infinite means.

2. The cross sectional performance of the top undervalued stocks and the bottom overvalued stocks display higher Gaussian standard deviation risk. However, they display lower stable Paretian alpha peakedness risk.

Measurement of risk with Benoit Mandelbrot's fat-tailed research turns the world of finance and investments upside down.

CHAPTER 30

Comparing Our Model against

Three Popular DDMs

Many investors, of course, are familiar with discounted cash flow principles and models. As already stated, DCF is generally accepted standard practice for valuing most any producing asset. The model is used to estimate the asset's ability to generate a certain amount of cash over a designated period, determine a level of fade and terminal value, and then discount that result back to its present value through use of a reasonable discount rate.

Over time, investors and scholars have developed a plethora of DCF

models. They are widely used in stock selection, although still falling far behind in popularity to the many earnings-driven statistical analysis models.

Most of the latter fall into the multifactor group. Among the most popular of the cash-driven variety are dividend discount models (DDMs).

We decided to compare our LifeCycle Returns (LCRT) free cash flow model against three popular dividend discount models. We don't hesitate for a minute to say that our goal is to prove empirically the significant advantages of the more sophisticated free cash flow methodology.

We believe our studies do exactly that, primarily by showing the limitations of the DDMs, especially in delivering on the previously stated four principles of an effective model, while demonstrating the abilities of our model.

Dividend discount models bring important advantages in general to investors. The models are commonly accepted and extensively used. They represent cash flows provided to investors. That's good. They also serve as helpful examples for demonstrating progress in model development because they begin by requiring a small number of inputs and can readily be used to show how adding inputs result in improvements.

The three DDMs under our close scrutiny are:

1. The Gordon model, which applies a constant growth of the dividend.

2. The GROW1 model, assuming a fading growth rate of the dividend.

1GROW grows the dividends at a high rate until fading them to a lower rate.

3. The ROPE2 model, based on a fading return on equity and

increasing dividend payout ratio.

Here's some basic information on each. The Gordon model is often labeled as covering one phase, because it assumes a constant growth rate and thus is best suited to value mature companies in the last phase of their life cycles. The GROW and ROPE approaches are labeled as two-phase or multistage models. Both assume an initial stage of dividends growing at a high rate, a fade period when dividend rates decline, regressing to the mean, and a terminal time when the dividend rate is constant. Both models discount cash flows at a constant discount rate. The two models are flexible in allowing investors to adjust the three stages based on their own due diligence, experience, judgment, and empirical evidence. Detailed explanations of the workings of each model are available in the recently published *Valuation Handbook* from publisher John Wiley & Sons.[3]

The primary disadvantage of the GROW and Gordon models is that they apply only to companies paying a dividend. The ROPE model can be used with companies not paying a dividend. The model assumes a payout ratio starting at zero and regressing to a median or average level. Thus, the ROPE model can be used to value companies generating earnings but not paying a dividend.

In general, dividend discount models fall apart when applied to companies without earnings. They can be applied to companies paying dividends, even though they have negative earnings. However, none of the models works in valuing companies with negative earnings and no dividends.

Additionally, each model offers its own other limitations. The Gordon model contains strict assumptions of a constant dividend growth, which is quite unlikely with most companies. The ROPE model is less robust in the number of companies it can value by requiring positive earnings to estimate future dividends. Remember the four principles of highly effective models.

2Although not explained in the article, our educated guess from the context is that ROPE stands for return on payout and equity.

3Rawley Thomas and Benton E. Gup, *The Valuation Handbook: Valuation Techniques by Today's Top Practitioners* (Wiley), pp. 111–114 in Chapter 5, "Developing An Automated Discounted Cash Flow Model," by Robert J. Atra, Chair of the Finance Department, Lewis University, and Rawley Thomas. The original references for these models were M. Gordon, *The Investment, Financing, and Valuation of the*

Corporation (Irwin, 1962); and M. Roseff, "The Three Phase Dividend Discount Model and the ROPE Model," *Journal of Portfolio Management* (Winter), pp. 36–42.

Another weakness: DDMs require fading the dividend, and thus their intrinsic value estimates are highly dependent on terminal value, instead of a straightforward calculation of intrinsic value based on a good analysis of economic fundamentals. For these models, a big portion of total present value is the calculation of terminal value, which by its nature is hard to estimate. As a result, according to a number of comprehensive studies, DDMs can produce biased estimates of actual stock values and thus are inherently inaccurate. Because our automated DCF model extrapolates historical data to compute intrinsic values, it avoids look-ahead bias that comes with investors/analysts inferring future terminal values from current prices.

Our comparative analysis is quite comprehensive. Use of the four models (including ours) in estimating intrinsic values encompasses more than 5,000

companies and covers a period of 12 years, starting in 1996. That adds up to over 50,000 years of data.

To make the analysis and comparisons meaningful, we set some parameters. These parameters take into account the built-in bias of dividend discount models to underestimate intrinsic values. For this reason, we choose parameters that tend to increase intrinsic value and then make adjustments in the models later.

For each company, we begin by estimating a discount rate, employing the capital asset pricing model (CAPM), using the long-term Treasury bond rate, the company's median industry beta, and an equity risk premium of 3 percent. We purposely use a low-risk premium (3 percent) as an initial parameter because it generally yields an unbiased estimate of intrinsic value relative to the ways dividend discount models price stocks. We estimate a 5 percent terminal growth rate with all the models, and we assume the simplest of fade rates by fading the growth immediately. Incidentally, this turns the GROW and ROPE DDMs into two-phase models. After testing the three dividend discount models on these initial parameters, we are able to see ways to improve them.

A useful side note: Investors certainly agree that their models aim to

estimate actual underlying values of companies. But the math constructs of most models serve to limit their allowable inputs. With our LCRT process, we try to avoid that. We can find fault with all three of the dividend discount models being examined. The constant growth assumption of the Gordon model enables valuing companies with expected dividend growth rates that are less than the discount rate. Even models with fading growth rates are limited. The GROW model has to rely on companies already paying a dividend to determine the next period's payout. Because it uses sustainable growth, the ROPE model needs positive earnings to generate a meaningful retention rate.

EVALUATING THE THREE DDMs

Now we are ready to evaluate the three dividend discount models against the four principles of robustness, accuracy, nonbias, and predictability. Our test of robustness aims to identify the number of years the model produces meaningful values for each company as a percentage of the total number of company-years in the database—more than 48,000.

Measurement of Robustness $=$ % of Total Company $-$ Years From Table 30.1, here are the results: The Gordon model is the least robust, at 10 percent, while the ROPE model is the most robust, covering nearly half of the universe. Of the two models using a fading dividend growth rate, the ROPE model doubles the number of companies covered by the GROW (25 percent) model. Of course, we realize there are other models out there and many offer more robustness than these three. What is important to count in our equation is that robustness is a critical factor, and it varies by model. To be blunt, what good is a model if it cannot calculate an intrinsic value for a company year?

Next we come to accuracy. A good model produces results consistent with actual prices. By consistent, we don't mean equal. It should be within a reasonable range—academics call this a range of bounded rationality. No model will ever match the intrinsic value precisely with the actual price all the time. Every stock would be priced at its intrinsic value, and there would be no profits to be gained from insightful research and smartly timed buying and selling as prices migrated toward intrinsic values. But models producing intrinsic values far from actual prices are suspect.

You saw in Figure 16.5 how our model works within ranges of under- and overvaluation in relation to fair or intrinsic value.

We measure accuracy by examining pricing errors. For our readers who enjoy math, see Equation 30.1:

Equation 30.1 Pricing Error

$IV - P$

$Error =$

it

it

Pit

TABLE 30.1

Results of Three DDMs

	Gordon		**GROW**		**ROPE**	
Period	**Stocks**	**% of Total**	**Stocks**	**% of Total**	**Stocks**	**% of Total**
1996–2007	5,004	10.4%				

12,104

25.1%

23,999

49.7%

Source: This material is reproduced with the permission of John Wiley & Sons, Inc.

where P is the market price of the stock, *i* at the time *t*, while IV is the
it

it

intrinsic value of the stock as computed by the model at the time. The smaller the pricing error, the more accurate is the model. Investors have two major interests in understanding pricing errors: **1.** To determine accuracy on an absolute value basis to make a buy/hold/sell decision; and/or

2. To better define and understand the model's penchant for systemic bias, played out in too many over-and undervaluations.

For us, what is important about understanding the pricing error magnitude of a model involves its ultimate role in predicting future returns.

We believe that intrinsic value represents the true value of a company and thus should establish the true eventual price of its securities. We expect the market price to migrate toward that intrinsic value. In this context, some pricing error is good. It suggests the return we can expect from buying the stock as it moves toward fair value. In practice, the most undervalued stocks should show the largest positive errors while the most overvalued stocks should show the largest negative errors.

However, pricing errors also can mislead investors dependent on their models. A key here is to realize that pricing errors are not normally distributed. Our study looks at mean pricing errors indicated by the three dividend discount models. Table 30.2 shows the absolute percentage pricing errors for the 40th, 50th (median), and 60th percentiles of the models. These are large ranges of pricing errors,

saying that the models do a poor job of estimating intrinsic values.

Take the Gordon model. It shows dividend values from near zero for stocks with small dividends, low growth rates, and large discount rates—typically younger, smaller companies and older, troubled companies—to values rising through the roof toward infinity for stocks with growth rates approaching their discount rates. Clearly, the model skews pricing errors.

TABLE 30.2

Absolute Percentage Errors of Three DDMs

Percentile	Gordon	GROW	ROPE
40th	54.2	110.0	76.6
50th	67.1	209.0	120.7
60th	78.6	321.3	238.9

Source: This material is reproduced with the permission of John Wiley & Sons, Inc.

100%

90%

80%

More Accurate

Model

70%

60%

50%

Less Accurate

Model

40%

30%

20%

Cumulative % of Universe

10%

0%

Model Error

FIGURE 30.1

More Accurate and Less Accurate Models

Source: This material is reproduced with the permission of John Wiley & Sons, Inc.

How do we interpret these findings? The errors may indicate a poorly specified model, suggesting there is room for the modeler to do a better job of estimating the discount or growth rates. This lesson helps

us figure out how to improve accuracy applied to our model.

The easiest and best way to evaluate a model's accuracy is to examine the entire distribution of absolute errors. We do this by plotting the cumulative distribution of the absolute errors. Done on a diagram, this allows us to visualize accuracy across the models.

Figure 30.1 plots the cumulative distribution function (cdf) of the absolute errors. Model accuracy is indicated by the sharply steep curve on the left-hand side; this implies lower errors and a tighter distribution of errors. Less accurate models on the right-hand side have a flatter cdf, revealing more variability and greater magnitude. You can clearly visualize the results.

TESTING THE MODELS FOR ROBUSTNESS

AND ACCURACY

As we have pointed out, all three models possess some benefits and limitations in their robustness (number of companies able to reasonably value)

100%

90%

80%

Accurate and Robust Model

70%

60%

50%

40%

30%

Accurate but Not Robust Model

20%

Cumulative % of Universe

10%

Model That Is Neither Accurate

nor Robust

0%

Model Error

FIGURE 30.2

Accurate and Robustness in Models

Source: This material is reproduced with the permission of John Wiley & Sons, Inc.

and accuracy (ability to estimate intrinsic value). So how do they do when robustness and accuracy are combined?

We use a cdf diagram4 to evaluate and compare three dividend discount models for a combination of robustness and accuracy on a hypothetical basis. Figure 30.2 establishes the basis for visually comparing a true and realistic evaluation of models for their combined robustness/accuracy qualities against our three dividend discount models. We adjust the vertical scale by the percentage of stocks comprising the universe that the model can value; accuracy is represented on the horizontal axis. Then, we evaluate the three hypothetical models.

In Figure 30.2, the first model exhibits accuracy (steep slope) and robustness (high vertical axis rise), covering 80 percent of the universe.

Model two shows good accuracy (steep slope left on horizontal scale) but low robustness, covering fewer than 20 percent of available stocks. Model three is a bust on both counts, indicated by a flat line suggesting substantial, varied errors. It also covers less than 20 percent of the stocks.

4To our knowledge, no one else has ever displayed the critical data of model robustness and accuracy in this way.

For a company-year where the model cannot calculate a value and the associated tracking error, we set the tracking error to an arbitrary very large number.

100

ERP = 3%

Industry

90

Median Beta

80

70

60

50

ROPE

40

30

Cumulative % of Universe

20

GROW

10

Gordon

0

8

16

32

64

128

256

512

Absolute % Price Level Tracking Error Scaled to Log2

FIGURE 30.3

ROPE, GROW, and Gordon Models

Source: This material is reproduced with the permission of John Wiley & Sons, Inc.

There is lots to be gained from this study alone for both investment managers and corporate executives, whether deciding which stocks to buy or sell or for management to decide how best to allocate precious resources within the firm. Improving the usefulness of the first model that ranks high in accuracy and robustness is best achieved by focusing added analyst effort on the 20 percent of the universe not being covered. Model two displaying good accuracy can be improved by figuring out how to expand the universe of stocks it can value.

Now we apply the cdf study to our three actual dividend discount models in Figure 30.3. The Gordon model isn't very robust. The GROW

model covers more companies but isn't very accurate. The ROPE model performs better, shown by its higher rise to a greater vertical distance.

Next, we test our three models for their bias. Bias is defined as the tendency of a model to systematically over-or undervalue stocks. A model is unbiased when half of the stocks are undervalued and half are overvalued when estimating intrinsic values. You readily can see how bias and accuracy are linked. A model consistently giving readings on intrinsic value that

TABLE 30.3

Signed Percentage Errors of Three DDMs

Percentile

Gordon

GROW

ROPE

30th

−58.5

−37.6

−26.6

40th

−45.3

−20.8

−12.1

50th

−29.5

−1.5

3.2

60th

−11.7

19.6

19.2

70th

14.1

43.8

38.0

Source: This material is reproduced with the permission of John Wiley & Sons, Inc.

are too high or too low isn't very accurate. Put a practical way: A model recommending mostly buys or sells isn't very useful.

We test for a good combination of accuracy and lack of bias by studying the "signed" errors of the three models, displaying those errors covering the 30th through 70th percentiles in Table 30.3. All three models demonstrate bias. Better are the GROW and ROPE models, moving from over-to undervaluing stocks within just one decile of the median, while the Gordon model tends to overvalue stocks, evidenced by the negative signed errors not turning positive until above the 60th percentile.

ROBUSTNESS, ACCURACY, NONBIAS

ENHANCE PREDICTABILITY

Through our nearly four decades of modeling work, we have shown that models providing good robustness, accuracy, and nonbias also are the most predictive. Thus, they are the most useful in enabling investors to achieve better-than-market returns.

Our definition of an accurate model needs further explanation. We want our model to compute intrinsic values close to actual market prices. Close but not perfect. A perfect model would match intrinsic value with market price, leaving no room to make gains. We believe that current market prices reflect errors around intrinsic values; the model essentially is predicting the future direction of the price by showing whether the stock is being under-or overvalued. As prices migrate toward the company's intrinsic value, the market is working to correct the pricing error. In this way, the model offers the best opportunity to achieve excess portfolio returns. Inaccurate models produce incorrect intrinsic values and therefore inaccurate signals on future stock price movement.

90

Gordon DDM Median Industry Beta

80

GROW DDM Median Industry Beta

70

ROPE DDM Median Industry Beta

60

50

40

30

20

+3 to +15 Moths

10

0

Median Return Fiscal Year

−10

1–5% 5–10%10–20%20–30%30–40%40–50%50–60%60–70%70–80%80–90%90–95%95–99%Top 1%

Bottom 1%

Percentiles of Under - or Overveluation

FIGURE 30.4

Return Versus Under (Over) Valuation

Source: This material is reproduced with the permission of John Wiley & Sons, Inc.

How predictable are the three dividend discount models? Naturally, we have conducted tests, using the measures of robustness, accuracy, and lack of bias. We divide each model into deciles, ranking intrinsic values from the most undervalued to the most overvalued, covering a period of 15 months of accounting data—a year plus the next quarter. We also track the performance of the top and bottom 1 percent and 5 percent of the over-and undervaluations as a way of testing the extreme results of each model. We are computing average annual returns and our testing period covers 12 years, starting in 1996. For a

model offering good predictability, portfolios with the most overvalued stocks should have the worst performance while portfolios with the most undervalued stocks should have the best returns.

From Figure 30.4, none of the three dividend discount models offers good results. Better is the ROPE model, which shows some predictability by producing increasing returns between the 30th and 100th percentiles.

REMOVING BIAS CAUSED BY A CERTAIN PARAMETER

Investors believing in their models are continuously at work trying to improve them. One area offering potential for improvement focuses on eliminating bias caused by a certain parameter.

We have studied these various parameter biases extensively in trying to remove their negative impact so we can apply the good results to our own LCRT model.

We have developed a parameter bias detecting procedure to determine if any specific input is systematically causing under-or overvaluations; removing it improves the accuracy of the model.

In our study, we are working with the ROPE model, because so far it is displaying the most promise. Our focus is on possible bias caused by the choice of discount rate to use. Our basis for comparison is to use CAPM

to determine the discount rate. There are other choices to compare CAPM

against: median industry beta, company-specific beta, or a beta of 1.00 (a uniform discount rate).

We have emphasized several times the importance of understanding the empirical feedback loop to better model building. Reducing model bias increases accuracy. Increasing accuracy both lowers fat-tailed risk and increases portfolio investment returns. We illustrate this process in Figure 30.5 with an example from our DDM research.

Then the virtuous research circle begins again. Seek additional economic driver variables that display bias, incorporate them into the intrinsic valuation model, and then reduce bias by adjusting the parameter of that one Reduce model bias = > Increase model

accuracy = > Lower fat-tailed portfolio risk = >

Increase portfolio return = > Seek another economic driver variable that biases the model = >

Reduce bias, increase accuracy, lower risk,

increase returns

FIGURE 30.5

Virtuous Model Development Cycle

variable. Continue adjusting the parameter until 50 percent of the firms are undervalued and 50 percent are overvalued. Then the bias is eliminated. It is useful to understand their model bias. Model builders who include company returns on capital to correlate the under/overvaluation against that return on capital variable may employ the visual and statistical technique illustrated next.

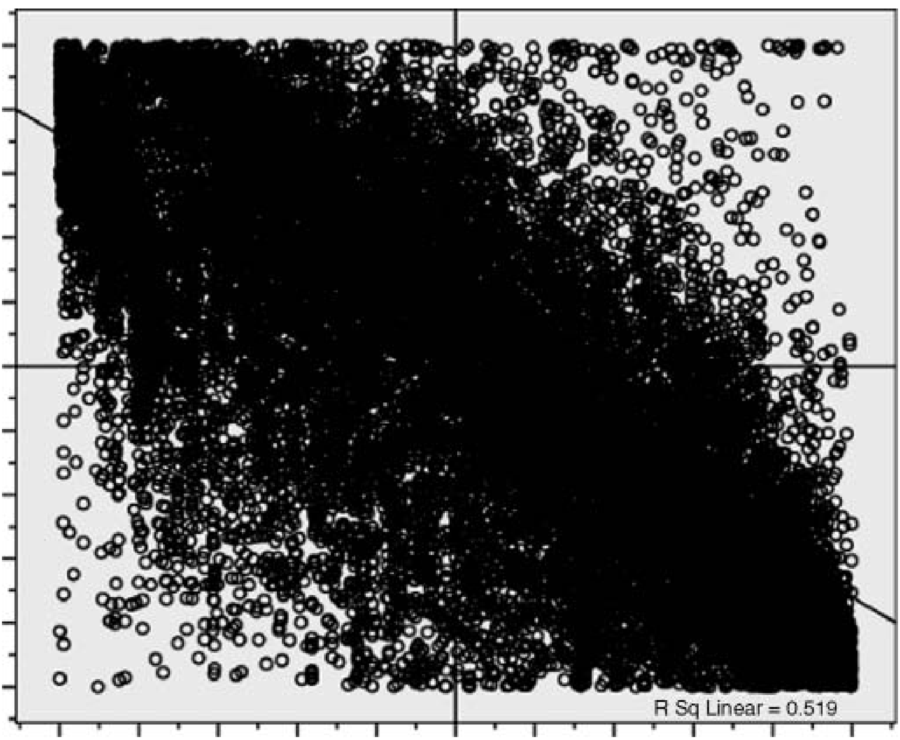
We need a better way to measure and visually display any bias in a variable that drives the intrinsic valuation and the under/overvaluation relative to the actual price. Biased models increase portfolio risk and lower portfolio returns. Those models can be improved by reducing or entirely eliminating the bias.

We're getting a little technical here. Because errors are not normally distributed, we test for parameter bias of any variable by running a regression of the "fractional ranks"5 of the over/undervaluation errors produced by the ROPE model against the fractional ranks of peer companies' betas estimated from using their median industry betas. Statistical programs compute fractional ranks by ranking the specific data tied to the parameter from low to high, assigning a value to each rank. We run a regression analysis to see if there is a relationship between the fractional ranks of the parameter values and the under/overvaluations. We can improve the model by removing the effect of that relationship bias.

Figure 30.6 shows a clear relationship between the fractional rank of the x-axis median industry beta and the y-axis under/overvaluations. The vertical scale runs from over-to undervaluations.6 The highly significant 51.9 percent regression R-squared indicates that the model

tends to overvalue stocks with high median industry betas while undervaluing those with low median industry betas. This indicates that the impact of beta on 5Correlating fractional ranks instead of the underlying numerical values represents a technique to address the high likelihood of non-normality of the data. Robert Blattberg and Thomas Sargent address this problem in their article, "Regression with Non-Gaussian Stable Disturbances: Some Sampling Results," *Econometrica*, Vol. 39, No. 3 (May, 1971), pp. 501–510. The central limit theorem requires a finite variance of the error terms. Where the error terms are infinite, as with stable Paretian distributions with the alpha peakedness parameter significantly less than 2.00, the central limit fails. Under these conditions, least absolute deviation becomes the preferred statistical method of analysis. Least absolute deviation avoids allowing the square of the outliers in both tails to dominate the regressions. Fractional rank regressions accomplish the same results.

6Put another way, a zero fractional rank represents the most overvalued firm, while a 1.00 fractional rank represents the most undervalued firm. This results from the fact that the signed tracking error subtracts price from intrinsic value.



1.00

0.90

0.80

0.70

0.60

0.50

0.40

0.30

Median Industry Beta

0.20

0.10

0.00

Fractional Rank of Under-or Overvaluation ROPE DDM—

0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00

Fractional Rank of Median Industry Beta

FIGURE 30.6

Under (Over) Valuation and Beta

Source: This material is reproduced with the permission of John Wiley & Sons, Inc.

valuations is too large. Conclusion: Beta drives down intrinsic values of high-beta stocks, causing them to become overvalued. At the same time, low-beta stocks with a low discount rate are likely to be undervalued.

Our solution to remove the bias caused by beta is to have a beta of one for all the stocks; in effect, setting a uniform discount rate. Some academic literature has concluded that better valuations result from using uniform discount rates, achieved by placing all the risk in the cash flow specifications.7 We use a uniform discount rate in our LCRT

model.

Figure 30.7 compares three versions of the ROPE model: beta of 1.00, beta = industry median, beta = specific company based on fiscal year monthly prices.

7For example see S. Kaplan and R. Ruback, "The Valuation of Cash Flow Forecasts: An Empirical Analysis," *Journal of Finance* 50 (September 1995), pp. 1059–1093; and T. Sougiannis and T. Yaekura, "The Accuracy and Bias of Equity Values Inferred from Analysts' Earnings Forecasts," *Journal of Accounting, Auditing and Finance* 16 (2001), pp. 331–362.

100

ROPE

ERP = 3%

90

80

70

Beta = 1

60

50

Beta = Industry

40

Median

30

Cumulative % of Universe

Beta = Company—

20

Specific, Fiscal

10

0

8

16

32

64

128

256

512

Absolute % Price Level Tracking Error Scaled to Log2

FIGURE 30.7

Comparing Robustness and Accuracy for Beta

Source: This material is reproduced with the permission of John Wiley & Sons, Inc.

We remove the bias caused by the discount rate and retest the ROPE

model, using the fundamental principles of robustness, accuracy, and lack of bias. Our scaled cdf (cumulative distribution frequency) in Figure 30.7

improves both the robustness and the accuracy. The slope of the ROPE

model with a beta of one rises more rapidly to a higher plateau than results of the same model using the median industry beta and the company-specific beta. The beta = 1 curve is above the beta = industry median. The beta =

industry median curve is above the beta = company specific from fiscal year monthly prices.

We agree with Fama and French in their 1992 article referenced before in Chapter 8 on "The Cross Section of Expected Stock Returns,"

when they write that beta is not useful in valuing stocks.

The empirical evidence above represents another fatal problem for the capital asset pricing model: CAPM-adjusted costs of capital does not increase the robustness and accuracy of dividend discount model intrinsic valuations.

90

ROPE DDM Median Industry Beta

80

ROPE DDM Beta = 1

70

ROPE DDM Fiscal Year Beta

60

50

40

30

20

+3 to +15 Months

10

Median Return Fiscal Year

0

−10

1–5% 5–10%10–20%20–30%30–40%40–50%50–60%60–70%70–80%80–90%90–95%95–99%Top 1%

Bottom 1%

Percentiles of Under-or Overvaluation

FIGURE 30.8

Returns versus Under (Over) Valuation for Three Beta Calculations
Source: This material is reproduced with the permission of John Wiley & Sons, Inc.

Now we are ready to test the value of increased accuracy on predictive capabilities. Using our decile analysis Figure 30.8, we compare various betas of the ROPE model (beta of one, median industry beta, and company-specific beta). Clearly, the model with the beta bias gone does best. The model with a beta of one shows a steady increase from the bottom 1 percent (most overvalued stocks) to the top 1 percent (most undervalued stocks).

Even during this time of a high-performing market, the spread between the top and bottom 1 percent is considerably large.

The ROPE model also exhibits higher performance over the GROW

and Gordon models when all three have betas of one; the latter two do not show any consistency across the deciles. Please see Figure 30.9, which illustrates these empirical results.

PORTFOLIO RESULTS FOR THREE ROPE MODEL

SPECIFICATIONS

As illustrated in Table 30.4, we did still one more test to show that removing the bias from a particular parameter improves the model. We built four portfolios:

1. Consists of the 20 percent most undervalued securities.

2. Consists of the 10 percent most undervalued stocks.

90

ROPE DDM, Beta = 1

80

Gordon DDM, Beta = 1

70

GROW DDM, Beta = 1

60

50

40

30

20

+3 to +15 Months 10

0

Median Return Fiscal Year

−10

1–5%5–10%10–20%20–30%30–40%40–50%50–60%60–70%70–80%80–90%90–95%95–99%Top 1%

Bottom 1%

Percentiles of Under - or Overvaluation

FIGURE 30.9

Returns for Three Models

Source: This material is reproduced with the permission of John Wiley & Sons, Inc.

TABLE 30.4

Returns for Three ROPE Models

EqualWeighted

Portfolio

Portfolio Percentage Return

Long Only (Top 20% Undervalued)

ROPE DDM Beta = 1

38.88

ROPE DDM Median industry beta

29.89

ROPE DDM Fiscal year beta

27.35

Long Only (Top 10% Undervalued)

ROPE DDM Beta = 1

50.45

ROPE DDM Median industry beta

40.83

ROPE DDM Fiscal year beta

26.73

Long/Short (20% Undervalued/ 20% Overvalued)

ROPE DDM Beta = 1

14.52

ROPE DDM Median industry beta

8.35

ROPE DDM Fiscal year beta

0.25

Long/Short (10% Undervalued/ 10% Overvalued)

ROPE DDM Beta = 1

20.30

ROPE DDM Median industry beta

10.08

ROPE DDM Fiscal year beta

(0.06)

Source: This material is reproduced with the permission of John Wiley & Sons, Inc.

3. A long-short portfolio investing long in the 20 percent most undervalued while shorting the 20 percent most overvalued stocks.

4. A long/short portfolio investing in the 10 percent most undervalued while shorting the 10 percent most overvalued stocks.

With the market up at the time, the long-only portfolio did the best.

However, removing the bias enabled the ROPE portfolio with a beta of one to outperform the other ROPE models. The rise in portfolio returns resulting from removing the bias ranges from about 6 percent for the 20/20

long/short portfolio to about 10 percent for the other portfolios.

USING OUR SOPHISTICATED FREE CASH FLOW PROCESS

One immediate and obvious conclusion from all this dissection of dividend discount models is that they are limited in their scope and ability to estimate the intrinsic values of companies accurately for most firms. DDMs are relatively simple and straightforward. While simple is good in isolation, too much simplicity creates bias, while significantly reducing accuracy and predictive capability to estimate the migration of price toward intrinsic value.

Standing in contrast for the better are more sophisticated models that estimate a company's free cash flow, namely, the cash left when all the bills are paid to reinvest in continuing growth and value creation. They offer more economic levers to pull for investors and analysts. These sophisticated people (you) want to build, continually refine, and apply models that perform better as defined by robustness, accuracy, nonbias, and predictability.

Our best case in point is our own LifeCycle LCRT model. We can compare it against the three popular dividend discount models we

have just analyzed. Our model estimates future cash flows of companies, independent of dividends, meaning it offers more robustness in being able to estimate intrinsic values of more companies. Recall that the Gordon model could cover only companies with expected growth rates less than the discount rate. The ROPE model doesn't assume an initial dividend, but estimates dividends based on earnings and retention rates, leaving out companies with negative earnings.

More sophisticated models should be more accurate because they accommodate more information in valuing companies. Those three other models have serious limitations. Dividend discount models in general fail to incorporate the balance sheet in establishing the company's value. The ROPE model includes a return on equity (ROE), but doesn't analyze the life of those assets that produce the ROE.

100

90

LifeCycle Model

80

Robustness

70

ROPE DDM

60

Beta = 1.00

ERP = 3.0

50

40

Accuracy

30

20

Cumulative % of Universe

10

0

8

16

32

64

128

256

512

Abs [(Intrinsic Value – Price)/Price] on Log Scale 2

FIGURE 30.10

Robustness and Accuracy for LCRT versus Best ROPE

Source: This material is reproduced with the permission of John Wiley & Sons, Inc.

In contrast, proprietary models like our LCRT model dig deeper8

into the drivers of cash flows by examining both the income statement and balance sheet. We show in detail the important role played by the data available from a company's balance sheet. All this accounting-based information is valuable, but it doesn't necessarily reflect the economics of the company without making important adjustments. Our model enables investors and analysts to adjust the information to cure distortions caused by GAAP accounting. These adjustments lead to increased model accuracy and therefore greater predictive capability in estimating future likely price change.

Our LCRT model in Figure 30.10 demonstrates increased accuracy and robustness when compared with even the best dividend discount models.

8For the advantages of digging deeper and an excellent historical perspective on valuation, please see William J. Hass and Shepherd G. Pryor IV, "The Value Edge: Reap the Advantage of Disciplined Techniques" in *The Valuation Handbook: Valuation Techniques by Today's Top Practitioners* (Wiley), Chapter 2, pp. 11–41.

For extending digging deeper into strategic corporate application, please see Arthur B. Laffer, William J. Hass, and Shepherd G. Pryor IV, *The Private Equity Edge: How Private Equity Players and the World's Top Companies Build Value and Wealth* (McGraw-Hill, 2009).

Our S-curve diagram above proves the points. The height of the curve shows our model to be more robust, valuing 50 percent more stocks than the ROPE model.

The diagram also shows greater accuracy along with the ability to value more companies. The steeper slope represents the increase in accuracy of our proprietary model. Adjustments to the model better reflect the true underlying cash flows, leading to more accurate valuations. Our model also does a better job of valuing companies that are hard to value, namely, startups and those with negative earnings. Bottom line: Investors can build better models based on improved accuracy and robustness. They don't need to trade one for the other.

Our goal in this chapter is to use dividend discount models as a comparison to show that automated discounted cash flow models can be improved. The key way to measure results is to compare models on the basis of their robustness, accuracy, nonbias, and predictability. These four measures work together in an integrated fashion to form the best models.

We add accuracy by removing bias.

We want to build the case that it is quite possible to integrate the vital measures of robustness, accuracy, nonbias, and predictability into one superior model in a systematic fashion. Investors and analysts can develop dominant proprietary models, leading to improved investment decisions and portfolio performance.

You can see how we are setting you up to see the advantages of our LCRT free cash flow model.

KEY TAKEAWAYS

1. LCRT's methodology builds from automated discounted cash flow modeling. Automated essentially means that the model can value any one or combinations of the thousands of companies that the investor selects from the 7,000 U.S. companies database for study without analyst intervention.

2. Four decades of intensive research produced four primary measurement principles to evaluate the performance of an automated valuation model.

a. Robustness. This determines the size of the universe of stocks that the model can reasonably value.

b. Accuracy. This answers the question of whether the model's intrinsic value estimations are close to actual market prices.

c. Nonbias. This helps us understand if the model systematically avoids over-or undervaluing the stocks within its scope and against its economic drivers.

d. Predictability. This determines whether the model forecasts stock returns rather than simply estimating current market prices.

3. More accurate models produce more predictive results.

4. Reducing bias from any driving variable increases accuracy and therefore predictive capability.

5. Applying these measurement principles of "goodness" to the terminal valuation structure of any analyst's traditional cash flow forecast with historical data from the entire universe can improve the analyst's intrinsic valuation process significantly.

6. Therefore, reducing terminal valuation bias will significantly improve the prediction of security analysts' forecasts.

CHAPTER 31

Suggestions for Additional Academic Research

This final chapter suggests topics for additional academic research. On

a consulting basis, LCRT would be delighted to collaborate with sponsors, academics, and government research personnel on the following topics.

Many of these research studies are broad enough to require a collaborative effort across many silos. This collaborative effort is unlike most academic research that most often attracts only one to three professors in one specialized area.

One way to accomplish this collaborative research might be through the Practitioner Demand Driven Academic Research Initiative (PDDARI) of the Financial Management Association International and as supported by the CFA Society of Chicago.

1. The focus of most of this research is on *in* efficient markets within ranges of bounded rationality.

2. Correlate all countries' real growth rates and debt capacities against tax structures and elements of the Index of Economic Freedoms to produce immense insights into incentive economics. Independent variable effects also should include monetary policy, fiscal expenditure multipliers, and the economic microstructure of property rights. The correlation research would likely suggest public policy changes for consideration based on the facts of how people actually behave in a dynamic economy. It also would prove most useful to tactical investment allocation between countries and asset classes. This research probably requires a collaborative effort among research personnel from the U.S. Federal Reserve, U.S. Treasury Department, Congressional Budget Office, other country monetary authorities, and credit rating agencies.

3. For executive compensation purposes, correlate total shareholder return to concurrent total intrinsic valuation return, using average daily prices.

4. Extend lower Benoit Mandelbrot fat-tailed risk and higher return with automated DCF to portfolio construction and trading strategies.

Replace Harry Markowitz traditional mean-variance portfolio theory with portfolio concentration theory. Portfolio returns are best achieved

by investing in the 20 percent most undervalued and 20 percent most overvalued securities, because these offer the lowest Mandelbrot stable Paretian risk to produce the highest returns. The middle 60 percent of fairly valued firms are actually the most risky, because we know the least about where their prices are likely headed.

5. Apply the measurement principles of robustness, nonbias, accuracy, predictive capability, and Mandelbrot fat-tailed risk measurement to fundamental databases, so client users can quantitatively judge the value added of each component:

■ With and without security analyst overlays.

■ With and without footnotes.

■ Based on current database versus pointin-time to measure the look-back bias.

■ From expanded XBRL chart of accounts.

■ Incorporate new data in electronic form from client security analysts to address outliers from automated DCF model results.

■ Apply value chart research methods to corporate bonds, while using one consistent model to value both equity and debt.

■ Compare databases of all major data vendors.

6. Create fractional Brownian motion-generating functions to replace IID

random draws to produce stable Paretian fat-tailed distributions instead of Gaussian normal ones. These generating functions must recognize hard barriers on the left tail, but no practical right barriers on the right tail. They should also recognize the softer barriers of the ranges of bounded rationality around intrinsic valuations and supply/demand equilibrium as the anchors.

7. Develop new empirically validated theories of corporate capital structure and dividend policy based on the DCF and fat-tailed risk principles outlined in *ValuFocus Investing*.

Epilogue — Key Takeaways

As a K–6 special education teacher, my wife Kelly challenged me to succinctly summarize for you the five most important takeaways from

ValuFocus Investing:

1. Simple to use, but not simplistic (like driving a car).

2. Conceptually sound.

3. Empirically validated.

4. Achieves lower risk to produce higher returns.

5. Unique.

ValuFocus is **simple to use**, because you visually compare current price to intrinsic value on a value chart. To avoid being simplistic, it hides all the comprehensive work necessary to produce the intrinsic valuations under its

"hood." Like a complex car, where you only need to know how to start, steer, brake, and accelerate, the value chart displays all the tools needed to select a stock to buy, sell, or short.

To complement ValuFocus, Bill Mahoney's writing style is conversational and therefore easy to understand.

The LCRT framework is conceptually sound—it is based on cash flow and the balance sheet, not earnings. Firms fundamentally create wealth by investing in strategies that produce rates of return above investor cost of capital return requirements.

The conceptual framework is empirically validated through extensive research with multiple models. Empirical validation includes measurements combined in ways not previously employed to our knowledge—robustness, lack of bias, accuracy, and predictive capability. Model parameters are based on 50 percent under-/50 percent overvaluation, not traditional least squares statistical approaches. The framework models risk in the cash flows, not the discount rate—especially for financial leverage.

To my knowledge, for the first time, *ValuFocus Investing* links Benoit Mandelbrot's advanced research on fat-tailed distribution risk measures to automated discounted cash flow. Automated DCF is based solely on historical financial statements without analyst intervention. Unlike traditional Gaussian normal risk measures, this linkage achieves lower risk to produce higher returns.

I have tried to acknowledge my debt to the research and thoughts that led to this simple-to-use, empirically validated, conceptually sound framework. Paradigm shifts1 always build on the "shoulders of giants" who preceded us. In my view, the LCRT empirically validated research uniquely

"connects all the dots" to create a comprehensive, unified framework for investment—both within the firm and in its securities. Enjoy.

1Thomas S. Kuhn, *The Structure of Scientific Revolutions*, 3rd ed. (University of Chicago Press, 1996). Kuhn first introduces the concept of "paradigm" on page 10.

About the Authors

RAWLEY THOMAS

R**awley Thomas** is president of LifeCycle Returns, Inc. (LCRT) in St.

Charles, Illinois. He served as assistant treasurer of SuperValu Stores, joined Callard, Madden in 1981, co-founded HOLT Planning in 1985, and directed value management research for the Boston Consulting Group for 11 years. Credit Suisse First Boston acquired the successor to HOLT

Planning, HOLT Value, in early 2002. Thomas was vice president of practitioner services for the Financial Management Association International (FMA) and is chairman of the FMA Practitioner Demand Driven Academic Research Initiative (PDDARI) Advisory Committee. Currently, he serves on the Northern Illinois Accountancy Board and chairs the FMA PDDARI Supported by the CFA Society of Chicago. The objective of PDDARI is to facilitate the development of cutting-edge research useful to practitioners, their firms, and the profession. Through this research initiative the FMA hopes to encourage academic research that addresses practitioner needs and to encourage interaction between the practitioner and academic communities. LifeCycle Returns supports investment funds, consulting firms, and investment banks with process consulting and licensed platforms to create world-class capabilities in their use of value management principles.

Rawley Thomas also co-edited, with Benton Gup, Wiley's *Valuation*

Handbook: Valuation Techniques from Today's Top Practitioners (2010).

He was a contributing author.

He wrote the chapter summaries and Chapter 14, "Common Themes and Differences: Debates and Associated Issues Facing the Profession."

With Robert J. Atra, Finance Department Head at Lewis University performing the primary writing, Thomas contributed to: Chapter 5:

Developing an Automated Discounted Cash Flow Model Chapter 10: The LifeCycle Returns Valuation System Chapter 9:

Lower Risk and Higher Returns: Linking Stable Paretian Distributions and Discounted Cash Flow

The FMA PDDARI web site is:

http://69.175.2.130/~finman/Practitioners/PDDARIpage.htm

WILLIAM F. MAHONEY

William F. Mahoney is a veteran journalist, investor relations practitioner, and author. He spent 20 years as editor of *Investor Relations Update*, published by the National Investor Relations Institute, began and served as editor of *Shareholder Value Magazine*, and was co-founder of VI LLC, serving as the editor of *Valuation Issues* newsletter. He has written four books on investor relations and corporate governance. Two of his books were translated and published in Brazil, and one was translated and published in Japan. His 20-year corporate communications career combined work with public companies and as a consultant. He served in investor relations and corporate communications positions with Motorola, Unocal, Scott Paper, Esmark, Young & Rubicam, and Chemetron. He began his career as a reporter for the *Ft. Wayne News-Sentinel* after graduating from Marquette University.

He also wrote Chapter 13, "Optimizing the Value of Investor Relations," for Wiley's *Valuation Handbook, Valuation Techniques from Today's Top Practitioners* (2010).

Chapter 13 ties many of the chapters together into implications for the communications from firms to their investors. Most important, Bill recommends that investor relations professionals transform their role from a simple service public relation function to being the resident investment market expert. By deeply understanding investor behavior, the market, multifactor, quant, and DCF intrinsic value frameworks, investor relations develops the core skills necessary to bridge between the firm's shareholder wealth-creating objectives and the investors who provide the capital.

Index

S

Document Outline